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A Weekly Journal
of the Mining & Mineral Industries

November 13, 1920

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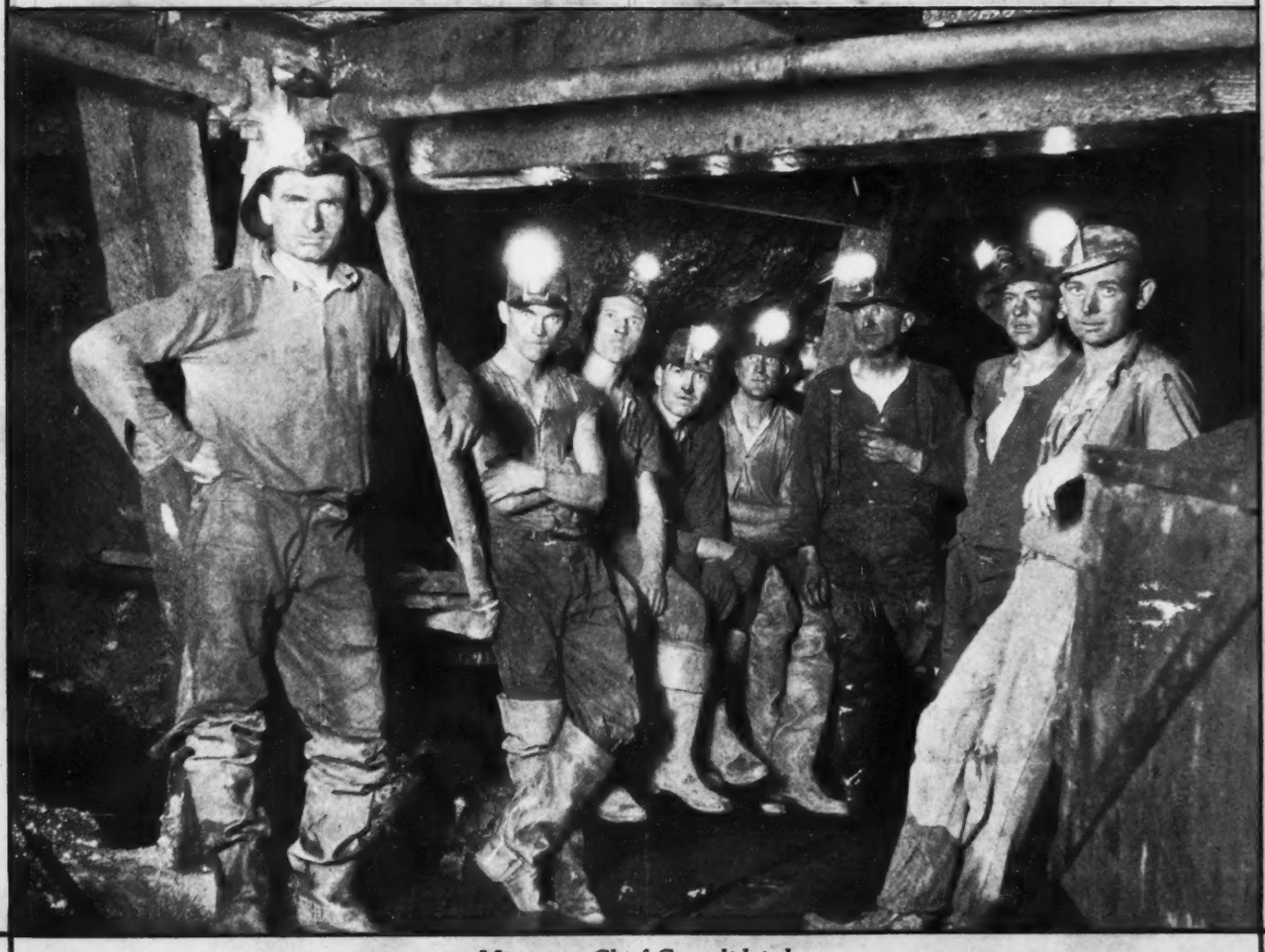

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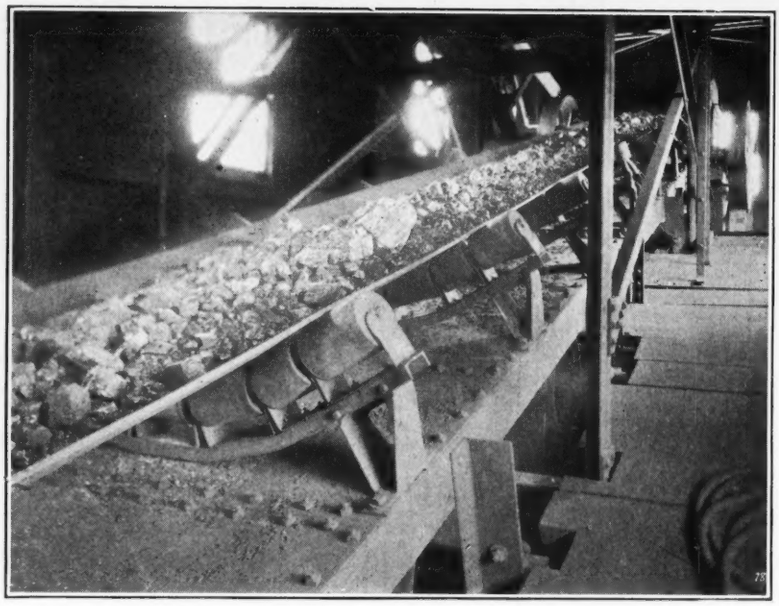

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Volume 110 **New York, November 13, 1920** *Number* 20

Combinations in Restraint of Trade

IT IS REPORTED that the farm organizations may call on the farmers of the country to hold up crops in order to sustain the market; and representatives of organized labor have advised the farmer organizations that they would support them in the fight for higher prices.

The miners, representing the other great basic industry of the country, mining, will watch the farmers curiously to see how they fare. The operation of the law against combination in restraint of trade has never been enforced against the greatest combination of all, organized labor, on account of a popular and possibly sound prejudice. That there is one law for the rich and another for the poor, as the agitators say, is true; but it is the supposedly poor who are favored by the discrimination. Also, the socialists' plea in their platform that the "burdens of taxation should be borne by the rich," is true at present, should the gentlemen pause to observe. Income taxes, inheritance taxes, excess profits taxes, all prune the plutocrat.

Millions of wage earners whose annual earnings have been between two thousand dollars and five thousand dollars never dream of paying an income tax; and no attempt is made at collection. On the other hand, we knew a retired mining engineer who complained that taxation cut his income in half; and we heard of another case (for we do not move in such circles) where a man was trimmed out of 85 per cent of his income, in a lucky year. Another pathetic instance was of a man who had nothing and who made half a million in speculation one year and lost it the next. Also, the next year he had to pay his income tax on the year before, and as the tax amounted to a snug little fortune, and not only his cash but his banking credit was exhausted, he was somewhat embarrassed.

This inequality between the supposedly rich and the supposedly poor—which, however, often means taxing the white-collared class who earn less and exempting the horny-handed class, including the makers of watch fobs and perfumery, who earn more—is one which all classes look upon with tolerance: the wage-earning class, of course, do not complain of it, and the other class are either confident of their ability to hand it on to the ultimate consumer or they are good sports. They realize the right of the crowd to pelt them with whatever is handy while they try to climb the pole; if they cannot stand the gaff, let them join the crowd and give the next man a chance to try.

But we question whether the farmers who are thinking to combine in restraint of trade are poor men—we suspect that they belong to the wealthy or capitalistic class. Certainly they are not wage earners. Therefore, with the dual consideration of law and sentiment—how far can they go? As miners, we should like to know. Take the gold-mining industry, for example. We believe it will be admitted that at present all gold miners fall into the class of poor men. Can they—may they—combine to withhold their produce until relieving legislation shall be passed? They are told that would be unpatriotic, but a poor gold miner of our acquaintance wants to know why it should be more unpatriotic than a farmer withholding his wheat, or a labor-unionist his productive work. Will the labor unions support the miners if they combine in restraint of trade, in a fight for higher prices?

The World's Petroleum Problem

THE world situation regarding petroleum is set forth clearly and comprehensively in a recent article in the *Saturday Evening Post* by Mark L. Requa, formerly oil administrator in Washington. He quotes the communication of the Department of State to the Senate on May 17, 1920, concerning the restrictions by foreign countries, especially Great Britain and France, on alien development and ownership, including that by Americans. Concerning this discrimination, the State Department note says: "In the absence of prohibiting treaty provisions, this form of discrimination would seem to be justifiable from the viewpoint of international law, *however impolitic it might be as regards reciprocity and international comity.*" Concerning this, Mr. Requa remarks: "It would seem the part of wisdom that the United States negotiate at once treaty provisions giving our nationals the same freedom that foreign nationals enjoy in America."

Mr. Requa further quotes at length the agreement between the two governments of Great Britain and France, signed at San Remo in April by Sir John Cadman and M. Phillippe Berthelot. "This agreement," the document runs concerning itself, "is based on the principles of a cordial collaboration and reciprocity in the countries where the petroleum interests of the countries can be amalgamated to advantage. The present memorandum refers to states or countries as follows: Rumania, Asia Minor, territories of the former Russian Empire, Galicia, the French colonies, and the colonies of the British Crown." This agreement is, in effect, a pooling of interests regarding present and future requisitions of petroleum. In regard to Russia, for example, Article 6 states that *"the two governments will give their joint support* to their respective nationals in their common efforts, with a view to obtain petroleum concessions and facilities for export, and to assure the delivery of petroleum supplies." Mesopotamia is parceled out between England and France. In the British Crown colonies, French nationals are accorded rights of exploration and exploitation similar "to those accorded to British subjects in the French colonies." American citizens have not these rights, whereas the citizens of France and the "subjects" of Great Britain

enjoy the same rights in American territory as do our own citizens.

Mr. Requa remarks that a careful reading of this agreement "should convince any but the most skeptical that if United States oil companies are to make any headway whatever in the acquisition of foreign sources of supply they must have the same enthusiastic government support and co-operation as that extended to foreign nationals by their respective governments." He discusses the problem for America dispassionately and fairly, pointing out the necessity which Great Britain is under for engaging in a campaign for petroleum resources, and that the only sound policy for the United States Government is actively to conduct its own campaign. He points out that the World War really resulted from the struggle for raw materials, such as the iron of Alsace-Lorraine, and the petroleum and other resources of the Near East; and makes the searching statement that "the sea and air will not be free to all nations for purposes of international commerce unless the sources of petroleum and the petroleum products themselves are made available to all on equal terms and without discrimination."

Mr. Requa concludes that "Adjustment should and can be made by international agreement. No one expects the petroleum companies themselves to arrive unaided at any such understanding. That is impossible. But a properly formulated international agreement, negotiated by governments, defining the rights and limitations under which the different nationals may operate, is not only possible, but necessary, if we are to maintain lasting peace. And that agreement must be founded on a very simple principle: equal justice to all concerned."

This situation as treated by the former oil administrator has been ventilated thoroughly in these columns —in fact, we believe that it was first published there. Subsequently the new British Ambassador, Sir Auckland Geddes, informed the American people that the report was unfounded, and circulated by those desiring to disturb the good relation between the two countries; and the bulk of the American press fatuously quoted Sir Auckland and approved. Also, the remedy proposed by Mr. Requa is the one that has been suggested by us editorially—an amicable understanding among the nations which need the world's petroleum as to how the available supplies are to be rationed.

Recently there has been much friction between England and France over their petroleum agreement, the French believing they have been given altogether the worst of the deal.

No more important problem awaits diplomatic and legislative attention on our part, in order to protect ourselves and insure the future peace and prosperity of the world, than the matter to which attention is here directed; and action on it should be one of the first evidences of a new domestic and foreign policy.

The Future of Mining In South America

THERE can be little doubt on the part of the student of economic geology that the mining industry of South America is destined to increase in scope and importance. The same great mineral belt which covers our Western States sweeps down uninterruptedly through Mexico and Central America, and is represented in South America from Panama to Cape Horn; and there are also the important mining districts of the eastern part of the continent, corresponding roughly, perhaps, with our important mining districts east of the Rockies. But with all her mineral wealth, South America, taking it altogether, is deficient in the one mainspring of industry—coal—so that even the immense iron deposits of Brazil remain a problem as to utilization.

We in this country are already seeing the dawn of the gradual forsaking of coal and petroleum for power purposes, wherever possible, for electrical power—preferably hydro-electric power. The Super-Power Survey, which is being made under the guidance of the U. S. Geological Survey, has as its object the establishment of a connecting network of power lines from Boston to Washington, with the object of maximum development and efficiency of existing electric power possibilities.

Something of this same thought has been communicated to South America, where it is, of course, especially necessary. In another column we abstract some information gathered by the Guaranty Trust Co. of New York concerning this movement. The report is mentioned that an international power plant, with a capacity of 150,000 hp., will be erected jointly by the governments of Argentina, Uruguay, and Brazil, at the falls of the Iguazu, in Brazil. An electric smelting plant and steel mill, the first of its kind in South America, will, it is reported, be built in the Province of Sao Paulo. In Bolivia, an initial expenditure of $10,000,000 for power plants is planned. The plans of the Guggenheim Brothers for the development of their tin mines in Bolivia include the building of a hydro-electric plant, and possibly an electric smelter. In Peru, also, electrical development is not only spreading throughout public utilities and extending itself to the railroads, but is being employed at the mines. The Cerro de Pasco mines, as well as the Vanadium Corporation of America, are constructing hydro-electric plants.

Altogether, we are evidently on the verge of a new era for South America, when the development of her vast hydro-electric power will permit the exploitation of her mines on a scale never before possible, by providing not only the power for the working of the mines but the neressary transportation facilities.

The Utah Consolidated-Utah Apex Lawsuit

IT IS A DELICATE MATTER to take sides in a dispute, however amicable, between friends, especially when one's knowledge of the question in dispute is limited and perhaps inadequate: yet we cannot forbear registering our approval, according to our lights, of the decision of Judge Johnson in the great Utah Consolidated-Utah Apex lawsuit. The sums at stake run up into the millions, and the best legal and geological talent was secured on both sides. The sole point at issue, according to our correspondent, was as to whether certain limestone formations, known as the Highland Boy and the Yampa, which were ore-bearing formations, were the lodes in the legal sense, or whether the almost vertical veins which cut them at nearly right angles were the lodes. Orebodies were shown by the evidence to have occurred frequently at the junction of the vertical veins with the limestone. The cropping or "apex" of the limestone formations was in Utah Consolidated ground: the cropping of the vertical vein-fissures in that

of the Utah Apex. To which party belonged the ore at the junction?

This would appear to be a classic example of the absurdities of geological and legal interpretation and definition which arise from the desire to twist the apex law to one's own protection or profit. To prove that black is white has long been considered the function of the legal brotherhood; and now the geologists take up the task of proving that the country rock is the vein. We note two encouraging circumstances, however: First, from the report of the testimony, the distinguished geologists who were retained by the country-rock advocates seem to have limited their testimony very conscientiously to the facts: and the second that the learned judge proved able to distinguish black from white after the geologists and the attorneys were through with the argument. Possibly the latter encouraging circumstance resulted from the former.

We do, however, file our objections to the definition of a lode proposed by Mr. Horace V. Winchell on behalf of the country-rock advocates: namely, that "a lode or vein is mineralized rock or rocks which contain such indications of valuable minerals as to justify development with the expectation of finding ore. As soon as quartzite over a considerable distance becomes mineralized, then it becomes a lode. Just as soon as either of the other rocks can produce and do produce ore, or contain indications which lead the experienced miner or prospector of judgment to develop it with the expectation of finding ore, then it becomes a lode."

We have all seen or heard of broad lodes: but this definition would establish the record for breadth. As the quartzites which lie between the limestone in Bingham Canyon also are ore-bearing, as was shown by abundant testimony at the trial, they are also lodes; and there is no country rock "whatever" in the district. And as there is no country rock, there are no walls to the different lodes, and, therefore, all the formations become, technically, geologically, and legally, one vast lode. The Bingham Canyon lode, we take it, therefore, is limited above by the pure air of Utah, in depth by the volcanic fires, on the north by the international boundary, on the south by Palm Beach, on the west by the sunset and on the east by Wall Street; and its apex passes into a problem of the fourth dimension.

An early explorer in Alaska traveled on the theory that there was one continuous lode from Alaska to Cape Horn; and the mineral discoveries which he made in Alaska proved to him the truth of his theory. There is a simplicity in this conception which reminds one of the "One Big Union"; at any rate, it would make mine reports easier for the mining engineer.

How To Pronounce Bauxite

THE diverting discussion as to the proper pronunciation of bauxite has run itself out in our open forum, the "What Others Think" department, with the result that there remain, as before, two opposing parties, more deeply confirmed in their previous views than ever. We hardily closed the discussion by remarking that as for us we pronounced the word *boxite* (probably nearer *bawxite*, for the orthography has doubtless a subtle influence in tempting us to prolong the vowel), following custom and intelligibility, and we justified our choice on the principle of the Anglicization of foreign words. We are tempted, therefore, to publish the opinion which we have just received from P. B. McDonald, assistant professor of technical English in New York University, confirming our judgment:

"Answering the query of Mr. Minum in your issue of Oct. 2, about bauxite, I would say that in my opinion the pronunciation has become Anglicized. Originally, the French pronunciation was boze-ite, as the dictionaries still give, but the usage of geologists and miners has made it much like box-ite. This is entirely legitimate. In a similar way, Pa-ree has become Par-is, and Roma has become Rome. We pronounce the plural of beau and chateau as though an 's' were added; the French, I believe, ordinarily pronounce the plural like the singular. To say boze-ite might suggest booze-ite, which Nevadans might confuse with hootch-ite."

We resent, however, the fling at the Nevadans. Nevadans, like Kentuckians, are judges of fine distinctions.

So then, boys, it's all settled. All together, one, two, three, now! *Bawxite! Bawxite!*

The Price of Basic Commodities

EACH month the National Bank of Commerce publishes a list of the wholesale prices of representative commodities, comparing present figures with those before and during the war. From the latest issue of its publication, "Commerce Monthly," we extract the following information:

Commodity:	Price — July, 1914	Price — High 1914–1920	Price — October, 1920	Present Per Cent of Pre-War Price
Beef cattle, cents per lb	9.10	16.80	14.70	161
Anthracite stove coal, dollars per ton	3.80	8.00	8.00	211
Bituminous coal, dollars per ton	1.30	11.00	9.00	692
Corn, dollars per bushel	0.70½	1.94	0.95	135
Cotton, cents per lb	13.31	41.50	20.25	152
Calfskins, cents per lb	20	90	18	90
Hogs, cents per lb	8.90	22.1	14.9	167
Crude petroleum, dollars per bbl.	0.75	3.50	3.50	466
Para rubber, cents per lb	68½	86	24½	36
Silk, dollars per lb	3.26	21.57	8.03	246
Wheat, dollars per bushel	0.89	3.30	2.22½	253
Wool, dollars per lb	0.68	2.35	1.30	191
Copper, cents per lb	13.5	32.0	16.25	120
Lead, cents per lb	3.9	10.75	7.60	195
Zinc, cents per lb	4.85	21.00	7.30	150
Iron, dollars per ton	13.00	53.00	46.00	354

This table of course represents prices which were current last month, and some changes have occurred since then, but it is no less interesting. On the whole, it would appear that metal producers as a class are suffering no more than other producers of basic supplies.

There is no general relation between present prices and those obtaining before the war. Some commodities, such as bituminous coal, petroleum, iron, wheat and sugar, are still altogether too high, and production has evidently not caught up with demand. Fuel seems to be especially scarce. On the other hand, leather and rubber are cheaper than before the war. Copper is now relatively cheap, and is not likely to drop much farther, and, of course, gold has remained unchanged in price. If prices are to readjust themselves on the old comparative basis, it would appear that iron and lead are due for a considerable fall.

American silver producers, of course, are provided for during the next three of four years unless the Pittman Act is repealed. Zinc producers, it would seem, can hardly expect higher prices for their product, but can look for lowered costs through decreased prices for fuel, labor, and other commodities which they require.

Gold Mining in the Southern States

Recent Development of Mines in That Section Hindered by Absence of Mining Code, Lack of Mining Experience, and Failure to Recognize Limitations—Under Efficient Direction Some Properties Should Be Successfully Operated

BY H. A. MEGRAW
Written for *Engineering and Mining Journal*

THE Southern States contain a vast amount of mineral wealth, much of which is being developed. This is no new fact to most of those familiar with the country. Iron, copper, zinc, lead, and other important minerals are being produced profitably, and the list is constantly widening. Few, however, know that the first authentic record of the presence of gold in that part of North America now included in the territory of the United States was on June 4, 1513, when Ponce de Leon, aboard one of his vessels off the coast of Florida, was told that a cacique, not far away, contained some gold. In 1516 and 1519, Diego Miruelo y Pineda found gold while cruising along the west coast of Florida. In 1527 Panfilo de Narxaez reported the presence of gold, and in 1539 Hernando de Soto found it in what is now the State of Georgia. Not many know that the first experienced miners in California came from Georgia, and that after them came the more highly skilled men from Cornwall. These facts make it evident that deposits of gold really have existed in the Southern States. Also, they, as a matter of fact, still exist.

Mining has not taken a more prominent place among the industries of the South, for several reasons. The early settlers, first of all, were not from a class accustomed to mining, and it probably did not occur to them to look for minerals. Gold does not and never did exist largely in the South in the form of highly concentrated, bonanza deposits. The ores were of comparatively low grade, particularly so considering that in that period extraction methods were primitive, laborious, and costly. Therefore the search for metal was not likely to be as assiduously prosecuted by a people so unfamiliar with the art as it might have been had the deposits been rich in virgin gold and easily accessible.

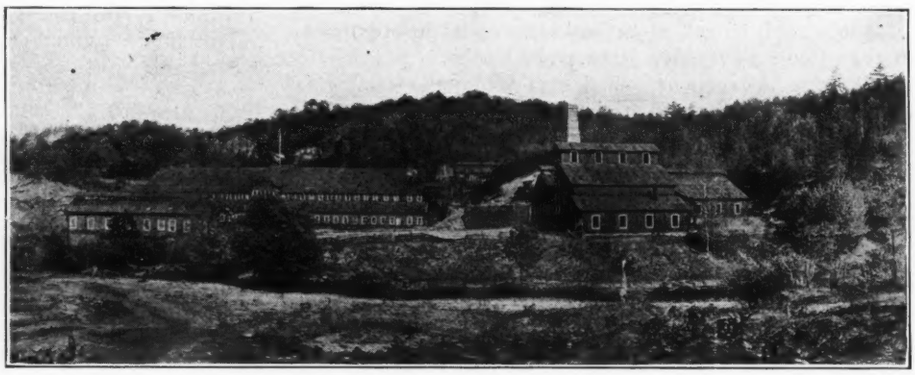
Furthermore, among the people of the South agricultural principles were well known. The land, exceedingly rich and tractable, made large profits easily obtainable through the practice of a familiar art. What need, then, to dig for gold when its equivalent might be obtained in an easier way?

INDIAN TRIBES RESENTED EXPLORATION

The native Indian tribes put many difficulties in the way of mining, as they had a strongly rooted reluctance to speak of it to foreigners and fiercely opposed all excursions of Europeans into their domains. And as mines occur in the roughest country, search for them placed the explorers in a position to be easily assailed. Consequently the practice received no encouragement.

The spirit of mining lay dormant for many years, until, in about 1799, John Reed found the famous Reed nugget at Meadow Creek, in North Carolina. This nugget weighed about 17 lb., and so slight was the current knowledge of minerals that it served several years as a door stop, prized only for its beauty as a stone. It was not until 1802 that Reed took his nugget to a jeweler at Fayetteville, who told him it was gold and induced him to part with it for $3.50. Many other nuggets were found subsequently, and mining began in the South. From 1804 to 1807 North Carolina provided all the gold produced in the United States, and all of it came from surface washings and shallow placer operations.

Vein mining began probably about 1825, in Montgomery County, N. C., a locality that has since produced much of the gold output of that state. Production was begun all over the Southern territory, from Maryland to Georgia, particularly in the Dahlonega district of Georgia, which became one of the most profitable in the South. Here the discovery of gold in 1829 was followed by much excitement. The mineral lands were claimed by the state and were disposed of by lottery.



DAHLONEGA CONSOLIDATED CHLORINATION PLANT, DAHLONEGA, GA. AN EXAMPLE OF OVER-INVESTMENT IN A SURFACE PLANT

WEST DRAINED SOUTH OF MINERS IN '49

Mining in general prospered for the next twenty years throughout the southeastern region. In 1849 the California excitement occurred, and, owing to the numerous and rich deposits that were soon discovered in the West, and because most of the skilled miners left the East for the more profitable fields of the West, mining in the South dwindled, and has ever since been followed in only a spasmodic and unstable manner.

The beginning of the Civil War put a stop to the small amount of serious mining work done up to that time. Only a little mining has been done since then, and much of that has been so colored with reckless speculation and downright chicanery, mostly instituted by adventurers from other parts of the country, that it has been impossible to distinguish the good from the bad. In recent years, however, mining upon a substantial basis has been

instituted in several parts of the South, and some success has been attained; enough, at any rate, to show that profits are possible.

The traveler through the Southern States who has knowledge of mining will find much to attract his attention and provide food for thought, but such a traveler must leave the beaten track of the tourist and delve into the backwoods where the old indications still remain. He will, at times, be surprised to encounter a small sandy area in a clay district, and will be at a loss to account for it until investigation shows that a mine and mill once existed there, and that the sand is the only remaining sign of a milling operation. He will find in another place a miniature canyon carved in a hillside, and, his attention arrested by the glimmer of white quartz, he will note that this is the outcrop of a vein that was worked from the surface and that, having reached the ground-water level, its operators found that the character of the ore had changed and that they had to deal with a pyritic rock from which they could not extract the gold, although it still existed in undiminished quantity. Indications of mines and mining abound, and with the knowledge of what has been done it is impossible to believe that the advances of modern times have not made available these sources of mineral wealth that have been so long burdened with a world of misunderstanding.

Extent of Southern Gold Deposits

The gold belt of the Southern States begins in Maryland and runs southwest through parts of Virginia, the Carolinas, Georgia and Alabama. It is of varying width and richness, but its character is much the same throughout. The area is one of crystalline schists, and the ores occur in veins of quartz and quartzite cutting regions of metamorphosed slates.

The most important and extensive gold-bearing area is the great zone of metamorphic schists and slates extending from southern Virginia, through central North Carolina, and into South Carolina. In this area have been located some of the famous producers, among which may be mentioned the Union, Gold Hill, Russell, Hoover Hill, Fentress and also the only large silver mine of the section, the Silver Hill, in Davidson County, N. C., which was in operation before the discovery of the Comstock lode. In recent times some important properties have came into the producing class in this area, notably the Coggins, Iola, Haile, and some others. In Georgia and Alabama other producers have been opened, and throughout the whole geological formation there is possibility of profitable mining.

It would be a futile and useless task to list the mines of the South or to attempt a detailed description of the rocks in which they occur. The geological bureaus of the various states have admirably accomplished this work, and anyone sufficiently interested may readily obtain information from this source. To those who care to study the subject, however, a word of warning should be given. It will be found that in many cases the cessation of former mining operations came about through lack of available metallurgical processes by means of which to treat the pyritic ores economically. There should be no loss of courage through the acknowledgment of this fact. Modern developments in geology and engineering are sufficient to lead to the reopening of orebodies that may have been lost, and modern metallurgy can confidently promise simple and economical methods of gold extraction, even from the most rebellious ores.

Three principal factors have opposed the successful carrying out of extensive gold-mining enterprises in recent years. None of them presents insuperable obstacles, but no success can be attained without recognizing them and adopting methods to overcome them. The first of these factors is the law. The mining code does not exist in the South, where the landowner is also master of whatever is within or beneath it. This discourages prospecting. No one will search for mineral deposits, because, even if he finds them, he has no commercial interest in his discovery except what may be granted through the generosity of the landowner. Prospectors are not prone to depend upon that feeling. The work is of a kind that entails hardships and privations, so that the one who does it is entitled to a proportionately great reward when success crowns his efforts. Such an expectation is entirely without basis in the South, and consequently there is no systematic search for minerals.

The second factor is the lack of acquaintance with mining principles and methods by the general population. The average inhabitant of the South is not familar with mining, and indications that might mean much to one having such knowledge would be quite without effect upon him. When a people have for generations followed specific industrial pursuits, a part of the knowledge concerning them that they possess becomes in a degree hereditary. Add to this the additional familiarity absorbed unconsciously through environment, and a race is produced equipped to attack, with assurance of success, the problems encountered. The people of the South are not so armed. And this fact presents an obstacle to be overcome.

The third factor in opposition is the failure to recognize the limitations of a developed property, a failure which is the common fault of the Southern miner and the Western man who operates in the East. The local operator is likely to run his business on a penurious basis, failing to recognize the just claim of a good deposit to first-class equipment. Also, the local man is likely to be imposed upon by the manufacturer of freak machinery of the sort conceived in a fevered imagination, manufactured solely to sell and bought only by those not conversant either with the industry in general or the needs of a particular property.

Western operators, on the other hand, accustomed to large and continuous orebodies, often make the mistake of overestimating the resources of a Southern mine. A common error is to cut short development and spend large sums on surface equipment. Not a few Southern gold mines have been saddled with surface plants costing from $100,000 to $300,000, a burden that usually precludes financial success. It is rare, indeed, that such equipment has paid for itself.

Veins Discontinuous and Not High Grade

Southern gold-bearing veins are usually narrow, of low or medium grade, and are not of even value over great distances. Either in strike or in depth the ore-body is likely to be cut off abruptly, and the precious-metal content may change constantly. The limitations both as regards extent and grade must be recognized and dealt with in a reasonable manner; if not, there is little hope of profit; but if due regard is accorded to them a substantial return is reasonably assured.

As has been said, all three of the obstacles to mining

in the South may be overcome. The first one, based on the state of the law, must be overcome by the property owners themselves. Each person who has, or believes he has, upon his property a gold-bearing deposit should explore it thoroughly before attempting to interest anyone else in its possibilities. A simple and reasonable way to perform this preliminary development is to open a series of pits upon the vein outcrops where they appear at the surface. If a man will dig such a series of pits about 20 ft. deep, spaced at intervals of about 200 ft. between his boundary lines, he will have done valuable work in leading to a correct appreciation of his property by obtaining a good idea of its continuity and making possible a correct sampling of the rock. Unless a vein has commercially valuable ore and reasonable continuity, it is worth nothing. If the developments show both of these requirements, it is time to enlist the services of an engineer, who will be able to direct further development and also to provide the owner with a good survey.

The only dependable estimate of the gold content of an ore is based on determinations made in the laboratory by a qualified chemist. These, although correct in themselves, are of no value, however, unless they represent a fair average of the orebody under investigation. Careful sampling is a prime requisite, and so much training is required to do it properly that, for the unskilled man, an attempt at it is merely a waste of time and money. The landower can, however, by panning, ascertain superficially what a sample of his ore contains. Almost every one understands the mechanical operation of panning, and if the operator will be careful to compare each result with the showing given by an assayed ore, taking the same amount of rock to pan each time, he will be able to get some idea of how the rock is running. But it cannot be too strongly urged upon the operator that sampling must be done so as to obtain a fair average of the vein sampled, or the work is worthless, or, worse, misleading.

Landowners Favored by Law

If every proprietor would carry out this operation upon his mineral deposit, then utilizing the services of an expert, he would place himself in a position to turn the legal obstacle to mining into a positive asset. This is because the absence of the mining law dispenses with all claims of doubtful ownership such as depend upon the apex laws. With this advantage the owner is himself the final court of estimate. He knows the value of his property and can sell it at a price he knows to be fair, or he can with equal justice offer it as fully appraised, to be balanced with capital invested by others. At this time the mining industry has passed far beyond the stage of wild speculation, and by intelligent people who understand the advances made in geology, mining, and metallurgy, it is recognized as an industry plainly based upon mathematically estimable factors that can be forecast with an uncommon degree of certainty.

By no means, however, is it to be forgotten that mining has one essential characteristic that distinguishes it from all other industrial projects. This is the fact that every pound of ore taken from a mine reduces its total content by just that amount, and every dollar removed from it reduces its total value by just one dollar. In other industries raw material may be produced *ad libitum* through labor, but no amount of labor will produce an ore deposit.

By removing the difficulty that depends upon the absence of mining law, the greater part of the second one, unfamiliarity with mining methods, will also be counteracted. A proper acquaintance with the true value of a mineral deposit does not come as naturally and intuitively as it does in some parts of the West, but is to be gained through application and thorough study of a clearly defined problem. The greatest difficulty, therefore, will come from inability to recognize the signs of mineral deposits. This faculty can be acquired by study and practice, and the mineral industry of the South will improve immensely when the general public begins to understand its principles.

Available Publications Should Be Studied

Probably the best way to get a preliminary idea of the character of any particular part of the country is to study the publications of the U. S. Geological Survey and of the geological department of the state in which the land is situated. Most of the Southern States maintain geological departments, either as a state bureau or as part of the state university system. The publications of such departments are to be relied upon, and may impart extensive and valuable information to serve as a basis for prospecting.

Southern mining companies have been inflicted with an unreasonable amount of incompetent management. Direction and administration have often been in the hands of some man of local importance, often the original owner of the land upon which the deposit occurs, and in spite of his earnest and honest endeavors he is foredoomed to failure through his lack of knowledge of the requirements. In other instances men are taken from totally different walks of life, apparently upon the presumption that anybody can manage a mine.

Another kind of management, equally bad, is typified by the Western man who comes to the South to take charge of a property. He is accustomed to mining, in a broad sense, but fails to estimate properly the value of the ore deposit. He is accustomed to continuity of value, and it does not occur to him that conditions will be different here. He is likely to place too much dependence upon widely separated samples, a course that will never do with the Southern deposits. Nor must it be presumed that the vein value will increase with depth. That is a myth that has been found generally not to be true anywhere, and it is particularly untrue in the South. Here most of the gold-bearing veins will cease to be profitable at depths varying from 300 to 600 ft.

In mining work in the South it is always best to secure the services of a competent engineer, one familiar with the Southern ore deposits; at any rate this should be done in the formative stages of mine development. The money spent for his services will usually be an ultimate saving, and an infinitely better investment than the purchase of machinery of doubtful value through a cheap but inefficient manager.

In conclusion, it may truthfully be said that some of the gold deposits of the South may be of value. They can be made, by wise and careful direction, to render substantial profits to their owners; but management must be skilful and certain, and the allowable investment must be carefully considered. There is no room for mistakes.

The Gold Miners of South Africa

In April, 1920, a total of 225,457 men were employed in the gold-mining industry of South Africa. Of these, 24,068 were white and 201,389 colored or native laborers.

Mexico's Industrial Progress Since Diaz

Nearly All Railroad Construction Now Under Way Planned Under Carranza — Oil Exports Tripled in Seven Years — Metal Output During Revolutionary Period Indicative of Mining Activities

By John E. Kelly

Written for *Engineering and Mining Journal*

INDUSTRIAL progress in Mexico since the time of Diaz has of necessity been interrupted and below normal, but despite the enormous destruction of property during the revolution, Mexico today is on a firmer foundation than she was on Nov. 20, 1910. The government of President Diaz and the strangle hold of the great landowners on the real estate of the nation were artificial, and the former could last only during the lifetime of its founder. It was bound to end in revolution, and the longer that revolution was delayed, the greater the loss of life and property that must inevitably ensue. The debacle threw the component elements that make up Mexico into a tangled heap, and it has taken ten years to settle them down upon a firm foundation once more. But, now settled, and the abuses of the Diaz and Huerta tyrannies abolished, Mexico faces the future with a brighter outlook than ever before.

Resumption of Industrial Activities

The industrial progress of a country is to be measured in relation to the stability of its government and the facility of communication. Progress in no wise remarkable now would have seemed miraculous to the inhabitants of the isolated villages of the Thirteen Colonies, confronted with Indian wars and impassable roads. That there was any progress at all during the years of the Carranza-Villa-Zapata dissensions, with the attendant paralysis of credit and communications, is evidence of the determination and courage of the native and foreign operators. The rise of Tampico to the position of the premier oil center of the world would have been an achievement of the first magnitude in the most peaceful country.

As an example of the progress of Mexican industry during the revolution may be cited the case of the City of Leon, Guanajuato, the scene of the battle that dealt the final blow to the Huerta regime. This city of 85,000 inhabitants is noted for its exports of shoes, shawls, and leather. In 1909, that is, under the Diaz regime, the total value of exports in the articles listed above amounted to 10,000,000 pesos. In 1919 the sum had risen to 23,000,000 pesos, and for the first nine months of 1920, a total of 20,000,000 pesos' worth of manufactured articles have been produced. This is a showing of which a city untroubled by political disturbances might well be proud.

The Railroad Situation

The railroads of Mexico experienced severe treatment during the revolutionary epoch, but, on the other hand, many miles of new track were laid, and other railways projected and contracts for their construction awarded. Apart from the delays caused by the constant burning of bridges by bandits, and the deterioration of roadbed and rolling stock for want of repairs, owing in part to lack of funds and, later, during the Great War, to the embargo on steel beams and parts, several roads were obliged to suspend operations completely, or at least to run bi-monthly. These included the Mexico Northwestern Ry., the operation of which was rendered exceedingly difficult because of the destruction of the Cumbre tunnel, several branches of the Mexican Ry., and all of the roads within the territory controlled by Zapata and Chavez Garcia.

Credit must be given the Carranza government for its attempt to restore the railways to their former condition, and even to construct needed additions. Nearly all the construction now under way was planned under Carranza, and the important Durango-Mazatlan and Sierra Mojada-Cuatro Cienegas projects were under construction when that government ceased to function. Colonel Paulino Fontes, promoted to be Director-General of the National Lines from his former post as Director of the Mexican Ry., bought over $2,000,000 worth of rolling stock, including forty locomotives, during the last few months of his administration.

The Mexican Ry. has been returned to its owners, the National Lines are either to be returned to, or bought from, the American stockholders, and the Tehuantepec railway is to be acquired by the Mexican government and double-tracked.

New Construction

New railroads, under construction or soon to be, include the following: The extension of the Southern Pacific of Mexico from Tepic to Guadalajara; the completion of the links of the Kansas City, Mexico & Orient from Creel to Estacion Fuerte, and from Falomir to Presidio, Tex., making this road upon completion the shortest route to the Orient, via the port of Topolabampo. A concession has lately been granted for a line that will join Tampico and Matamoros, where it will have connection with the Gulf Coast lines. An electric interurban is to traverse the oil fields between Tampico and Tuxpam; the valuable hardwood forests of Quintana Roo are to be tapped by a new line; the completion of the Durango-Mazatlan line is being rushed, and it is hoped to run the first train by the first of the year. A line starting at Casas Grandes, Chihuahua, will connect with the Nacozari line, giving, in connection with the K. C. M. & O. and the Durango-Mazatlan route, three railroads across the divide and opening up very rich regions. Mexicali will be connected with San Felipe Bay, below the mouth of the Colorado River; Toluca and Zitacuaro will have rail connection; and a new road will be run from the city of Zacatecas to the prosperous towns of Jerez, Villanueva, and Tultenango. In addition, the great bridge on the Pan-American railway at the Guatemalan boundary is under construction. When completed, there will be physical rail connection between northernmost Canada and Nicaragua, and, with only a few miles missing, to the Panama Canal.

More than any other section, Yucatan has suffered from the revolutionary epoch, not so much from the revolution itself as from the ambitious schemes of one of its leaders, and industrial progress may be considered to have practically ceased since 1914. Cut off from easy communication with the rest of the republic, and depending for its prosperity on the sisal harvest, Yucatan has been temporarily ruined through the attempt to implant a new social order modeled somewhat after the first French Revolution; the control of the sisal sales by the formation of the Comision Reguladora del Mercado de Henequen, and the practical monopoly of other commerce by the Compañia de Fomento del Sureste. These companies were permitted to issue bonds in payment of their purchases from the producers, and when, through mismanagement, they both failed, bankruptcy became universal throughout the peninsula. The Comision Reguladora was founded to regulate the price of sisal in favor of producers, as the name indicates, but the arbitrary attitude it assumed toward foreign purchasers, and the lack of a sound financial foundation, doomed it to failure. As the sisal producers were bound to deliver their fibre to the Reguladora and to accept its bonds in payment therefor until such time as the fibre should have been sold, the failure of the enterprise found them with the bonds on their hands, and dragged them down along with it. The Mexican government is now attempting to relieve matters, and has taken over the fleet of steamers owned by the Reguladora in exchange for the government's redemption of the Reguladora's paper.

Yucatan has not only been the victim of bankruptcy, but of the high cost of labor. The leader of the revolution who founded the Reguladora preached the doctrine of Bolshevism and the supremacy of the manual laborer. Socialism has never enjoyed any considerable hold upon the rest of the Mexican people, who are strongly individualistic, but in Yucatan the experiment has been tried—with disastrous results. The *socialistas* forced the scale of wages beyond all reason, a porter demanding a peso for carrying a trunk two blocks, and other labor asking from six to ten pesos for work that paid two to three pesos on the mainland.

The result might have been foreseen. The market was dull, the planters could not redeem their paper, labor was out of sight, and there followed bankruptcy, starvation, and emigration. The socialists found that a supremacy that permitted them to starve was of no value, and thousands have emigrated to the mainland, where the capitalist may rule, but pays.

Mining During the Revolutionary Period

In periods of political upheaval, mining is, from the isolated location of a large number of mining camps and from the nature of the industry itself, more liable to suspension but less susceptible to complete destruction than other enterprises imperilled by the same revolution. A stock of goods or a factory may be looted, the torch applied, and save for the possibility of insurance, the loss is total; a ranch may be raided, buildings destroyed, and cattle driven off—the disaster is almost as complete. A mine's surface structures may be demolished, workings flooded, *gambucinos* or local revolutionary leaders may rob the rich pockets (Zapata worked several mines to secure metal for his coinage), the shaft may be dynamited, but though any or all of these occurrences may cause extremely heavy loss, the great bulk of the property's values remain intact. Upon the return of peaceful conditions their existence may serve as security for a loan to replace the damaged structures. In the cases outlined above, however, the merchant or factory owner has no such asset. Governmental indemnification for losses sustained during revolution having remained to date in the theoretical stage, industries must absorb their losses and progress, suspend, or cease to exist in proportion to their ability to rehabilitate themselves through their earnings or assets.

The location of factories in or near large towns presumably well garrisoned permits them to operate safely and to secure supplies and an outlet for their products after the outlying regions that contain many important mining camps have been cut off. It is the history of Mexico that revolutions have their birth in the mountains, and the miners swell the rebel ranks, paralyzing the mines and making the mining camps the scenes of the first skirmishes. The original army of Don Miguel Hidalgo y Costilla was composed largely of miners from Guanajuato, and the revolution that overthrew Diaz started in the mountains of Puebla and in the foothills of the Sierra Madres, at Guerrero, Chihuahua. Villa was a miner, and a good one, having worked at Sta. Eulalia, and General Manuel Dieguez, a prominent figure in the Carranza regime, joined the Madero revolution from the mines at Cananea.

New Government Encourages Mining

Hundreds of mines have been abandoned throughout the republic as a result of conditions existing during all or part of the last decade, but it would be incorrect to claim that no progress has been made in mining during that period. The millions of dollars' worth of metals that have been exported in that time are proof of that progress. Many properties were worked with only slight interruption, new deposits were discovered, and the attitude of the present government is most encouraging. To give impetus to the re-establishment of mining, especially in the remoter regions that have lain almost idle under the sway of bandit leaders, the laws entailing the loss of property through non-payment of taxes have been suspended, so as to give the owner protection against the claim jumper looking for rich properties delinquent in taxes. A report issued by the Departamento de Minas shows that thousands of owners have availed themselves of this ruling, and mines are being reopened in every section.

Prospecting and denouncing of new tracts never ceased even during the most disturbed periods. In September, 1918, at a time when Villa still prevented operations in most of Durango and Chihuahua, when Paleaz, Arrellano, de la Llave, and Felix Diaz kept the east in a turmoil, and when the pacification of Morelos and Guerrero had not reached a point guaranteeing the safety of prospectors, 1,897 hectares were filed on, covering land in twenty states. The following month 2,010 hectares were denounced.

Since 1913 the export of Mexican oil has tripled, Tampico now occupying second place among the ports on the American continent in point of tonnage. This is a remarkable example of progress, the more so when the constant quarrels between the oil interests and the Mexican government are taken into consideration. The oil situation and controversy are too well known to require discussion here. To what point the exports

would have risen had there been no friction with Mexico City since 1913, only those on the inside can estimate.

The known gusher territory in the Huastecas is constantly being expanded, a supposedly wild-cat well in the southern extremity of the field having recently come in with a volume of oil equaling the largest of those already in exploitation. Since oil has become so important a factor in the life of industry, explorations have been pushed in every part of the republic, and it is announced that concessions amounting to more than 7,000,000 acres have been granted in Lower California, Sonora, Sinaloa, Tamaulipas, Chiapas, Coahuila, and Vera Cruz. Discoveries of seepages and other promising indications are reported from the lower Conchos River country, the southern part of the State of Chihuahua, Campeche, Jalisco, and some of the islands off the west coast.

The cost of producing oil has increased during the last decade but not as much as in other countries. Mexican products bring a high price in the world's markets, and as labor is still cheap by comparison with the United States, the operator finds the future offering a promise of recompense for the losses of the past. Statistics collected by one of the leading Mexican papers show that the cost of common labor, taken throughout the republic, averages only slightly in excess of one dollar gold per day, ranging from 30c. in Colima and Chiapas, and 75c. in Mexico City (the latter figure is paid by the Secretariat of Communications and Public Works for road laborers), to the highest figures in the north and in the oil fields.

Industry has made surprising progress during the period since the fall of Diaz, considering the difficulties and in some cases the hostility of the momentary rulers that it has had to endure. The perseverance displayed by the owners and operators during the most hopeless times will find its reward in the period now opening, for the election of General Obregon seems to ensure an "era of good feeling" in Mexico and augurs well for that country's future.

Gold Production of India

Although September was only a thirty-day month, the production of the Indian gold mines for the period, 35,497 oz., shows a further falling off of 1,878 oz. as compared with the August output. The production of gold in fine ounces for 1916 to 1920 follows:

	1916	1917	1918	1919	1920
January	45,214	44,718	41,420	38,184	39,073
February	43,121	42,566	40,787	36,834	38,872
March	43,702	44,617	41,719	38,317	38,760
April	44,797	43,726	41,504	38,248	37,307
May	45,055	42,901	40,889	38,608	38,191
June	44,842	42,924	41,264	38,359	37,864
July	45,146	42,273	40,229	38,549	37,129
August	45,361	42,591	40,496	37,850	37,375
September	45,255	43,207	40,088	36,813	35,497
October	45,061	43,041	39,472	37,138	.....
November	45,247	42,915	36,934	39,628	.....
December	48,276	44,883	40,149	42,643	.....
Total	541,077	520,362	485,236	461,171	340,068

The individual Indian results for August and September, 1920, are as follows:

Company	August Ore Crshd., Tons	August Gold Prod., Oz.	September Ore Crshd., Tons	September Gold Prod., Oz.
Balaghat	3,300	2,363	3,200	2,468
Champion R	12,503	6,404	11,623	5,016
Mysore	20,120	13,193	18,485	12,851
N. Anantapur	800	962	800	952
Nundydroog	8,736	6,004	8,450	5,753
Oorgum	12,900	8,449	12,700	8,457

Japanese Copper Smelters

The following list of some of the more important Japanese copper-producing plants, together with names of officials, was recently sent us by a correspondent:

Kuhara Kogyo Co. (Kuhara Mining Co.)
- Mines at Ibarakiken, Tagagori, Hidachimura, Japan.
- Refineries at Oitaken, Kitauruibegari, Saganoseki, Japan; Chinnanpo, Korea, and at Hyogoken, Shikamagari, Yejima, Japan.
- Largest production in Japan. Highest chimney in the world.

Sumitomo Besshi Kogyosho.
- Mine at Ehimeken, Umagori, Besshiyamaura, Japan.
- Refinery at Ehimeken, Ochigori, Miyakubomura, Tomura, Japan (Generally called "Shikajima").
- Second largest production in Japan (20,000,000 lb. per year.)
- Owned by Baron K. Sumitomo. "Chief of Mine," K. Ohira.

Furukawa Mining Co.
- Mine and smelter at Ashio.
- Refinery at Nikko, Japan.
- Third largest production in Japan. (Has other plants besides the above.) Owned by Baron Furukawa. Head office at Tokyo. Chief Engineer at Tokyo, Kumatoro Nakai, M. E.; assistant chief engineer, at Tokyo, S. Hayashi, M. E. Superintendent at Ashii, Isdzu Sugimoto; assistant manager at Nikko, Juruku Kaku.

Kosaka Kozan. (Fujita Mining Co.)
- Mines and smelter at Akitaken Kazunogori Kosaka, Japan.
- Fourth largest production in Japan.

Hidaira Dozan.
- At Miyazakiken, Higashi, Usukigori, Kitakatamura, Japan.
- Owned by Viscount S. Naito. Chief engineer, Y. Kasahara.
- Production about 6,000,000 lb. per year.

Homanzan Kozan.
- At Shimaneken, Katarugori, Hatsakomura, Japan, and at Shimaneken, Yatsukagori, Iwasakamura, Japan.
- Owned by T. Hori. Chief engineer, O. Kuwabara.

Kinoshima Seirensho.
- At Hiroshimaken, Takeharakogai, Kinoshima, Japan.
- Head office at Osaka, Japan. General manager, M. Matsui. Manager at Kinoshima, M. Tsugaki.
- Production about 3,000,000 lb. per year.

Kunitomi Kozan. (Tanaka Kogyo Co.)
- At Hokkaido, Shiribeshi, Iwanaigori, Ozawamura, Japan.
- Chief of Mine, K. Tamura.
- Production, 3,000,000 lb. per year.

Yoshioka Kozan. (Mitsubishi Kogyo Co.)
- Mine at Okayamaken, Kawakamigori, Fukiyamashi, Japan.
- Refinery (Osaka Seirensho) at Osaka Kitaku Shinkawasakicho.

Note: Kozan = Mine; Kogyo = Mining; Kaisha = Company; Seiren = Refine; Seirensho = Refinery.

This list is not complete, nor is its accuracy guaranteed.

Ontario's Lead Production From One Locality

The entire output of pig lead in Ontario during the first half of 1920 came from the mine and smelter near Galetta, on the Ottawa River, operated by the Kingdom Mining, Smelting & Manufacturing Co. The product was consigned to the James Robertson Co., Ltd., of Montreal, manufacturer of plumbing supplies. A small recovery of lead from the silver ores of Cobalt is treated in the United States refineries, returns of which are received at the end of the calendar year.

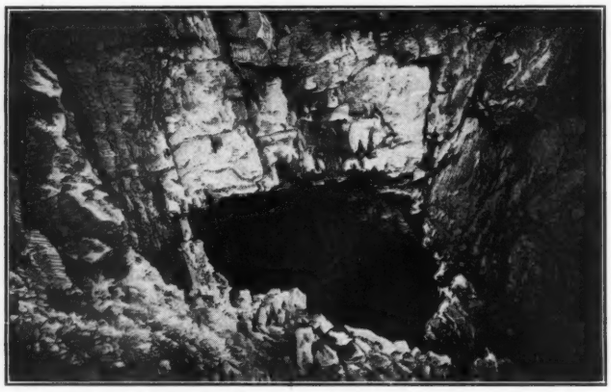
Roman Mining in Wales

Wild Country No Barrier to Development of British Mineral Wealth Two Thousand Years Ago —Lead and Silver the Particular Objects—Little Known Regarding The Work Except From Remains

BY W. B. PALEY
Written for *Engineering and Mining Journal*

THE exact causes of the Roman invasion of Britain, perhaps the greatest event in British history, will probably never be known with certainty, but modern researches make it fairly clear that possession of its mineral wealth was a principal object sought. It is difficult to conjecture for what other reason the Romans immediately drove a road from the nearest part of Kent right across the country to the west coast of Wales at Carnarvon. The distance, by the route they took, was about 300 miles, and considering the absolutely wild state of the country, densely wooded, with choked-up overflowing streams, it was a remarkable work, worthy of the great people who undertook it. It brought them into a wonderfully rich mineral country where virgin ore lay on the surface ready to be gathered up by the first hand that wanted it. Branch roads were soon added, linking up the mining centers. Many portions of these roads, in the wilder parts of Wales, remain to this day.

The mineral traffic was conducted by pack-horses, carrying one or more "pigs" of metal. These were



THE PORTAL OF A ROMAN MINE

dropped, or lost in the snow perhaps, from time to time, but wherever they are found a Roman road is close by. That the lead mines of north and mid Wales produced them is shown by the name of a tribe called the Cangi, Ceangü, or Kiangi, cast upon them. This, with the sounding titles of the Emperor, giving the date, proves where they came from, as the Cangi are known to have inhabited a large district thereabouts.

The lead must have been smelted in the district, but the ashes of the furnaces are found more often than the furnaces themselves. The Roman furnaces of all kinds, however, were very small, probably often of a temporary character, so that their remains can be traced only in comparatively few places. Possibly fresh ones were set up as the source of wood fuel receded.

Charcoal was chiefly used. There was wood enough and to spare, but the mining operations of the Romans were continued to the end of their domination, and in 350 years a sensible clearing of the forest land must have been effected in some places. Lack of sufficient mechanical power to produce a strong blast, however, led to imperfect extraction of the metal, so much so that in the seventeenth and eighteenth centuries the beds of Roman slag were found well worth smelting over again. Some of these beds are of great thickness and extent, especially along the river Wye, where it separates England and Wales. The neighboring Forest of Dean contains plenty of coal, much of it in thin seams cropping out on the hillsides. To what extent, if at all, this coal was used in smelting the iron ores is difficult to say. Surface coal is generally poor stuff, but it is certain that the Romans used it as house fuel at several places where it lay ready to hand.

The method of mining the iron ore in the Wye Valley was simply to follow a vein or "pipe" of ore so far as a man could get, or so far as it remained profitable. Sometimes the miners started from the face exposed in a cavern dug in the hillside, as shown in the illustration, and sometimes from the bottom of a large shallow pit. When the vein became thin and only one man could work in it, he squeezed along, using a short iron crowbar to pull down the ore, while another man raked it up into a box or basket and passed it out. Oak shovels as shown in the cut, formed of split laminæ, have been found and seem to have been held in the right hand and filled with the left. The hole in the center may have been intended to let the water run through when working in wet ground. Wedges, chisels, and hammers were used. By their aid galleries were cut in all directions in the two hills, called the Great Doward and the Little Doward, near the Wye between Ross and Monmouth.

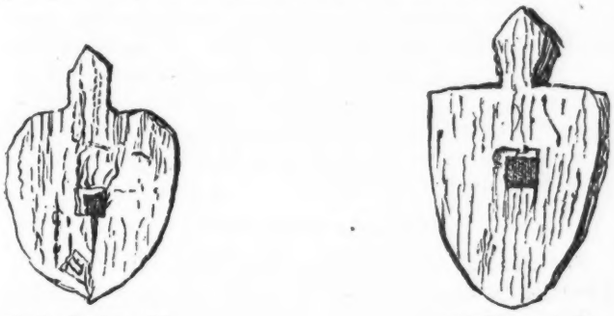
Iron was mined by the Romans in many other parts of the island, but the Forest of Dean and thereabouts seems to have been the principal seat of the industry. The iron is thought to have been shipped chiefly from a place near Southampton, now called Bitterne, to which suitable roads were made for the purpose.

Lead, however, was what the Romans wanted most. They employed it lavishly, if clumsily, in thick sheets, and seem to have used it for almost everything. Down below the streets of York, Colchester, London, and many other towns lie the remains of the citizens of the days of the Cæsars, each in a massive leaden coffin elaborately decorated with patterns of scallop shells and other devices. At Bath the leaden water pipes in the public baths, where the veterans of the legions used to reinvigorate their war-worn limbs, are of absurd massiveness. Not only north Wales but central Wales has extensive lead deposits, which have been worked ever since Roman times and are not nearly exhausted yet.

The county of Montgomery, especially, contains numerous traces of Roman mines and must have been extremely rich in ore at one time. The ore contains a good deal of silver, which the Romans well knew how to extract. Many of the leaden pigs bear inscrip-

tions stating that the silver has been separated. Copper is also found in the same neighborhood, and in the form of bronze was much used by the Romans. Both the copper and the lead were practically on the surface when first worked. On Llanymynach Hill, in Montgomeryshire, are extensive remains of Roman copper mines, the mineral being a green carbonate. Near the pits are signs of vitrification, showing that the ore was smelted on open hearths. Copper was worked at least so far down the north Wales coast as the Great Orme's Head.

The mines of Wales and the English counties bordering upon it were certainly fully worked before the end



11 inches by 8½. 16 inches by 8½

OAK SPADES FOUND IN ROMAN MINES

of the first century of the present era, although the subjection of Britain was not taken seriously in hand till A.D. 43 by Aulus Plautius.

Of the people who actually worked in the mines little is really known, but probably they were the aboriginal inhabitants, treated as slaves and forced to work whether they would or no. Guarded by soldiers drawn from various conquered countries, they could expect little sympathy or kindness from them or from the Italian experts who directed the mining operations and who saw that the fixed amount of tribute in metal was duly sent to Rome. In fact, they were treated much in the same way as the Spaniards treated the Incas of Peru, for the Romans, with all their great qualities, were a cruel and brutal race at heart.

Lookout Towers Used in Surveying

An essential task preliminary to the mapping of any area is that of covering it with a connected system of triangles in which each angle is accurately measured. Ordinarily this task is slow and expensive, but recently topographic engineers of the U. S. Geological Survey, while working in the heavily timbered area of northern Maine, saved great expense by making observations from the numerous steel lookout towers erected by the Maine Forestry Commission to aid in protecting the timber from fire. These lookout towers range in height from about forty to seventy feet, and in each of them a watchman is stationed day and night during the summer and fall. The Government surveyors found that these towers make admirable observing stations, and by using them they were able to do work in five weeks which would otherwise have consumed four or five months. In this way they saved several thousand dollars and were able to cover a larger area than they could otherwise have covered with the funds available. The State of Maine thus derives a double benefit from its wise provision for the protection of its forests.

The Position of the French Iron Industry

In a recent article in the *Echo des Mines* the writer combats the optimistic utterances of some of his countrymen on the subject of France's iron ore position. The statements which have been current to the effect that France holds Germany by means of her ore, and will henceforth dominate the metallurgical industries of Europe, are described by the writer as altogether illusory. In proof of this contention figures are adduced showing the pre-war distribution of ore produced in the three regions—French Lorraine, annexed Lorraine, and Luxembourg. These figures demonstrate that of the total national production of 40,000,000 metric tons, 27,000,000 tons were consumed in France, Lorraine, and the Sarre, leaving for export 13,000,000 tons, of which 5,000,000 tons went to Belgium, 4,700,000 tons to Luxembourg, and 3,900,000 tons to Germany. Where, then, the writer asks, is the alleged immense German outlet for French ore?

It must not be forgotten that Westphalia and the Ruhr, the only metallurgical regions in Germany capable of consuming Lorraine ore, have always been large importers of the rich Spanish and Swedish ores (in 1913 the importations were 3,632,000 tons and 4,558,000 tons respectively), and that of the 8,500,000 tons of Rhenish-Westphalian pig iron only 1,500,000 tons (about 18 per cent) have been produced from Briey, Luxembourg, and Thionville minette. Thus, Germany has been dependent on France to the extent of only 18 per cent of her pig-iron production in normal times, and as the German works are not producing more than 50 per cent of their capacity, owing to the restriction in the coal supplies resulting from the Spa Convention, Germany's dependence on Lorraine ore is now correspondingly less. "The solution of the problem of our ore exports would," the writer concludes, "be perfectly simple, if it were merely a matter of exporting 13,000,000 tons out of the 40,000,000 tons we produce. Its complicated nature arises from the difficulty we shall experience in treating, as before the war, 27,000,000 tons in Meuthe-et-Moselle, Lorraine, and the Sarre; and if the output of ore increases, as it probably will do, or even if it remains stationary, it will not be 13,000,000 tons we shall have to export, but 15,000,000 or 18,000,000 tons. Should we propose to get over the difficulty by exporting pig iron instead of ore, we shall want coke, more coke, still more coke!"

Australia's Copper Manufactures

An agreement is under discussion between the Queensland Minister for Mines and the Copper Works at Port Kembla, in that state, according to *The Ironmonger*, which provides for the purchase, for two years, by the company, of Chillagoe blister copper up to 300 tons a month, and of the gold and silver it contains, at the market price ruling over a mean of seven days at the time of arrival of the copper at Port Kembla. A large quantity of copper is awaiting treatment at Port Kembla, for, by commonwealth regulation, copper must be refined before it is exported from Australia. With the exception of one works in the United States, the Port Kembla Copper Co., of Queensland, is the only works in the world where copper ore is smelted, then electrolytically refined, and finally rolled into wire. The manufacture of sheet copper is under consideration.

An American Engineer in Japan

First Impressions of the Land Where Every One Seems Happy—Predominance of Manual Labor Surprising—Transportation Facilities in Need of Modernization—Engineering Knowledge in Demand, but Practical Application Left to Mechanics

By Charles F. Mason
Written for *Engineering and Mining Journal*

FIRST impressions are frequently misleading; and it is not without hesitation that I am putting down my first impressions of Japan, with the hope, in some cases, and fear in others, that they may prove to be erroneous. Certainly no impression could be more pleasant to the impressée than that created upon steaming into Tokyo Bay on a perfect June day, with Fujiyama occasionally visible through the haze to the west. Rounding Treaty Point we find ourselves suddenly in Yokohama harbor, where we anchor only long enough for a brisk examination of the ship by the health authorities.

Being met at the pier by Japanese friends, the customs examination is no ordeal at all, and in the twinkling of an eye I am bundled bag and baggage into a waiting *takushi* and am on the way to the train for Tokyo, about eighteen miles distant. My regret at not having more time in which to enjoy the new thrill of being for the first time in Japan is tempered by the assurance of my friends that other places are of far more interest than this; and by my own still, small voice telling me that, after all, I am on business and not on pleasure bent. Later experiences convince me that no line can be drawn between pleasure and business in this land of pleasure—the two are inseparably connected in a thousand ways.

Prodigal Expenditure of Human Energy

Aside from the thrill at being for the first time in a strange land, my primary astonishment is at the apparently enormous expenditure of human physical energy on all sides of me. Each day, at first, I think, surely this must be a special occasion—these men (and women and children, too) tugging heavily laden carts through the streets, or poling ponderous barges along the canals single-handed at a snail's pace, or handling back-breaking steel billets by main strength in a rolling-mill—surely they must be putting a shoulder to the wheel to tide over a temporary rush! But as each new day fails to show any slackening up, I am forced to the conclusion that this is the every-day state of affairs here. And, later on, I see the carter and his wife enjoying a few quiet puffs in the shade of a tree by the roadside; the boatman at his ease at his tiller while a favorable breeze carries his cargo (and probably his home and family as well) nearer to his destination; the rolling-mill crew squatting in the shade outside of the mill fortifying themselves for the next task with tobacco smoke and hot tea. Human energy has its limitations here as well as anywhere else!

A walk at night through one of the popular streets in any of the larger cities is a trip through fairyland, in which one loses all sense of time or distance. And here again comes the thought: What special holiday has brought all these merrymakers out to participate in the gayety? Night after night, however, one sees the same scenes and comes to the same conclusion: This is different—this is Japan!

A predominating characteristic of all these gatherings, which strikes the Occidental visitor most forcibly, is the courtesy which prevails at all times. A smile always brings a smile in return; a scowl is never seen. I have yet to see a quarrelsome person on a street in Japan. This despite the fact (or because of it, perhaps?) that alcoholic beverages of all degrees of intoxicating power are plentiful and inexpensive.

Sartorial Freelancing

The matter of clothing apparently concerns Mr. Average Japanese Citizen not at all. Whatever appeals to his fancy or imagination he puts on and wears without a trace of self-consciousness. Anything goes, and goes unnoticed. Of course the kimono is still the national dress, for both men and women, the latter generally wearing the gayer colors, but Occidental garments are widely worn; often in, to us, at least, ludicrous combination with the native dress. The wooden shoe, supporting the feet of the wearer two or three inches above the ground, is practically a necessity on account of the condition of the streets, which are generally either very muddy or very dusty, and frequently both, within a few hours' time.

Transportation facilities here are certainly in urgent need of modernization. The waterways are used to an extent never dreamed of in our own fair land, but the roads are usually very narrow and crooked, making motor traffic slow and difficult. Practically all of the steam railways are narrow gage, which fact does not become very noticeable, unless in the comparative slowness of the trains, which rarely travel faster than thirty or thirty-five miles per hour, until a night trip in a sleeping car is undertaken. I am a man of slightly less than average stature, at home, but here I fill a lower berth to overflowing both ways. The government is preparing to widen the gage of some of the main lines, but it will be several years before any great changes are made—this is Japan! The railways, in common with all enterprises here, employ several times the number of operatives that would be considered necessary on American lines, and they are invariably courteous and cheerful.

University of Hard Knocks Not Popular

In meeting and talking to Japanese engineers during these last few weeks, I have been impressed with their expressed desire for information on all engineering subjects. If I may be permitted a mild criticism of their quest for information along engineering lines, after such short acquaintance, it is this: In very many cases they want only knowledge that comes in tabloid form, so to speak. Books without number are devoured, and lectures without end are listened to with rapt atten-

tion (I am told that all Japanese are inveterate lecture-goers), but apparently the good old University of Hard Knocks has a very small attendance. Whether this is owing to the inherent cleanliness of the race, making the idea of greasy hands and dirty clothes abhorrent, or merely to the idea that practical experience is unnecessary in the profession of mechanical engineering, I am not prepared to state. This is one of the impressions that I sincerely hope will prove to be wrong, although it applies to many who have received part of their training in foreign countries as well as others who have been educated entirely in Japan.

The variety of occupations existing within a few square yards, or even under the same roof, is amazing to us. Here a jinrikisha stand shares the same shelter as a jewelry store; there a blacksmith shop nestles close by the side of a tiny restaurant; over yonder is a small building whose first floor is shared by a stone cutter and a tailor, while a tea house does a flourishing business upstairs.

Osaka, as this is written (early August), is a very unattractive place for the pleasure-seeking tourist. Being the principal industrial city (it is called the "Pittsburgh of Japan"), it has little to appeal to the seeker for the æsthetic, although it figures prominently in the history of Nippon. The population numbers about two million, I am told, and, all things considered, Osaka should be the best place in Japan in which to get in touch with the industrial, and particularly the engineering, progress being made in this country.

The Wonbah Molybdenite Mine and Mill, Queensland, Australia

Mineral Occurs in a Pipe of Quartz—Ore, After Being Crushed by Stamps, Is Treated in Mechanically Agitated Flotation Machines

BY J. H. REID

Written for *Engineering and Mining Journal*

THE Wonbah Molybdenite Mining Co., Ltd., is the premier producer of molybdenite in Queensland and apparently also in Australia. The mining lease is situated at Wonbah, a siding on the railway to Mount Perry from Bundaberg, the latter being one of the largest sugar-growing centers in Australia. It is about sixty miles inland from the Pacific coast in the heart of the Coastal Range.

Geologically, the occurrence is of extreme interest, for it consists of an almost pure white quartz pipe in granite, close to a dike of quartz-porphyry and near the periphery of the *massif* in its contact with Paleozoic slates. The pipe, which is almost cylindrical, varies from 42 ft. to 60 ft. in diameter between the surface and a depth of 200 ft. It is not tortuous and has a regular inclination or dip of about 15 deg. from the vertical. Calcite is rather abundant and in the lower levels small masses of chalcopyrite, pyrite, galena, and blende have appeared. The outer zone of the pipe is the working area, being richer in molybdenite. The working face is 16 ft. across, leaving a central core standing about 25 ft. in diameter, which is relatively poor.

The ore consists of white milky quartz with coarse and fine flakes, and also masses, of molybdenite. The base sulphides mentioned occur as small segregations, which are discarded in mining, leaving quartz and a little calcite as the only gangue to be eliminated in the flotation treatment. The ore going to the mill averages 0.8 per cent MoS_2.

The mill comprises a battery of ten head of heavy quartz stamps in conjunction with a 12-in. unit oil-flotation plant (Minerals Separation Co. and De Bavay's patent). The flotation machine is driven by a 33 hp. Crossley suction gas engine with openhearth generator. Recently thirty to forty tons of ore have been treated per day (three shifts). The crude ore is broken to 1½ in. and passes to a plant storage bin (capacity fifty tons) on a slow conveyor belt which permits boys to hand-pick the material, all solid ore being thrown on to a dump, from which it is bagged and shipped direct.

The 1,000-lb. stamps, with ninety-eight drops per minute, crush the ore to pass woven-wire screens with 625 holes per square inch. The pulp is elevated to a Callow settling spitz, which feeds the coarser particles to the stirrer boxes while the slime overflow is carried by launder to a Dorr thickener (capacity 100 tons). The thickened slimes are laundered to a 4-in. elevator having a speed of 200 ft. per min., and elevated to meet the feed from the Callow settler.

The flotation machine is a 12-in., six-stirrer unit, and consists of six stirrer boxes at the back of the machine and six flotation boxes at the front. The stirrers, or mixers, have a speed of 450 r.p.m. The pulp from the Callow settler and Dorr thickener is introduced into the first stirrer box with four parts of water to one part of pulp, and eucalyptus oil is automatically added, ½ lb. of oil to one ton of crushed ore. Extremely small quantities of kerosene, of unfixed amount, are also added periodically to assist frothing.

The comminuted ore is forced into the flotation box, where the floated MoS_2 overflows and is carried by launder to two concentrate bins 10 ft. x 5 ft. x 4 ft. 6 in. each. The non-floating gangue, with up to 10 per cent of unrecovered molybdenite, is passed through the remaining five flotation units, and from the last box the residues go to the tailing dump. The initial treatment gives a concentrate of 70 per cent MoS_2, but at the end of the month the whole of the concentrates are re-treated, bringing the grade up to 90 per cent.

The concentrates are dried on a small openhearth furnace and bagged. The output is purchased and exported by Messrs. Dalgety & Co. on behalf of the British government. The following figures give the output of the mine and the value of the concentrates for the last two years:

Year	Crude Ore, Long Tons	MoS_2 Concentrates, 90 per Cent, Long Tons	Value, £
1918	2,435	13.95	6,052
1919	6,026	41.75	18,100

It will be seen that the production last year was considerably greater than in 1918.

Rumanian Mineral Resources

Minerals in Rumania which have not yet been fully exploited, according to *Commerce Reports*. are asphalt (the Germans exported 3,000 tons), mica (the Germans exported 400 tons), and graphite. Throughout the mountainous areas there are quarries of granite, quartz, sand, limestone, gravel, china clay, gypsum, and some minor minerals, which could be worked with advantage. It is only recently that this wealth has been exploited.

An Old Game With a New Angle

SAN FRANCISCO CORRESPONDENCE

THERE is a nice kettle brewing away out in the Far West. The Broken Hills Silver Corporation, Governor Boyle of Nevada, the Fidelity Finance Funding Co., of Reno, Nev., G. E. Arrowsmith & Co., of San Francisco, E. C. Bellows, State Commissioner of Corporations of California, the San Francisco Stock Exchange, Jacob S. Herzog, better known as George Graham Rice, a few lawyers and mining engineers, as well as the Blue Sky Law of California, several newspapers of San Francisco and that part of the public eager to thrust its money into every widely advertised mining project are the chief ingredients in the kettle. Needless to say, it is not a savory mess. The pot is so actively boiling that it is difficult to disentangle the relation between the good and bad ingredients.

As near as ascertainable the facts are these: The Broken Hills Silver Corporation was incorporated under the laws of Nevada to acquire and operate a silver prospect southeast of Fallon, Nev. According to accounts, the property in question is considered to be a likely prospect. Shipments of high grade have been made, and attracted considerable attention. The company was capitalized at 3,000,000 shares, par value 10c. each, treasury stock 2,000,000 shares, the stock being fully paid and non-assessable. Ed Malley, of Carson City, treasurer of the State of Nevada, is named as the president of the company. The 2,000,000 shares of treasury stock have been underwritten by the Fidelity Finance & Funding Co., of Nevada, reputed to be under the control of George Graham Rice. This company is said to have imposing offices in Reno. C. H. McIntosh is president.

It should not be overlooked that George Graham Rice once made Reno and Nevada the center of his activities before he moved to the richer fields of the East. According to an advertisement that appears in the *San Francisco Chronicle*, on Oct. 8, 1920, the Fidelity Finance & Funding Co., of Nevada, will pay the Broken Hills Silver Corporation $380,000 for this 2,000,000 shares of treasury stock. After this whole transaction is over, it appears from the same advertisement that the Broken Hills Silver Corporation will possess the mine and have left available assets of $247,500, which is presumably to be spent for mine development, equipment, and operation.

Under date of Oct. 7 the stock was sold at approximately 19.5c. per share on the San Francisco Stock Exchange. At this price the whole 2,000,000 shares would have a sales value of $390,000. This would indicate a profit of $10,000 to the Fidelity Finance & Funding Co. It is obvious that the dear public is to be stampeded into actively bidding up the stock so that its sales price will be forced upward without regard to intrinsic values. All such activity will swell the profits of the Fidelity company, although the mine itself will get no additional capital. It, the mine, has farmed out its stock for $380,000. The Fidelity company gets all above this that it can. It's an old story with new words.

G. E. Arrowsmith is the San Francisco broker handling the stock sales in San Francisco. He has placed an extensive advertisement in the *San Francisco Chronicle* of Oct. 7. This advertisement is cunningly worded and undoubtedly designed for stampeding the unwary, the ignorant, and the "suckers" into parting with their money. It appears from published accounts emanating from E. C. Bellows, State Commissioner of Corporations of California, that the Broken Hills Silver Corporation began in June to arrange to sell its stock without first applying for permission from the Commissioner of Corporations, as required by the California laws. When this was called to George Graham Rice's attention he filed a "statement of fact" with the commissioner. This was not an application for a broker's license. Rice later asked the commissioner to investigate his holdings in Nevada. This was done and it is stated that the findings of the commissioner's engineer, Fred M. Miller, were unfavorable.

To the surprise of the commissioner the stock was offered for sale on the floor of the San Francisco Stock Exchange. W. G. Deal, attorney for the San Francisco Stock Exchange, according to published statements, said that the San Francisco Stock Exchange listed the stock of the Broken Hills Silver Corporation after a formal application accompanied by a letter from a reputable Reno lawyer as to title and after examination had disclosed that reputable persons of Nevada were officers in the company and that Arthur Perry Thompson had made a report that the property was one of merit. Upon that showing the property was listed. The discovery was then made that the Commissioner of Corporations had no jurisdiction over sales made on the floor of the exchange between brokers. Thus a hole is punctured in the California Blue Sky Law.

Apparently now the only restraint upon the sales of miscellaneous stock is the good faith of the Stock Exchange with the public. The significance of these happenings will be appreciated when it is said that in 1919 the total of transactions in Divide stocks reached $50,000,000. The San Francisco Stock Exchange is made a party, unwittingly or otherwise, to the evasion of the laws of the State of California because it affords a market for stock speculation.

Governor Emmet D. Boyle of Nevada was drawn into the limelight by reason of a letter which he sent to C. H. McIntosh and in which he made indiscreet statements about the merit of the property. This letter appears in the stock-selling advertisements in the *San Francisco Chronicle* of Oct. 8. In sharp contrast, there is the effort of Commissioner E. C. Bellows to protect the public and enforce the California laws against questionable practices, and two officials of the State of Nevada lending their names to a company of questionable repute.

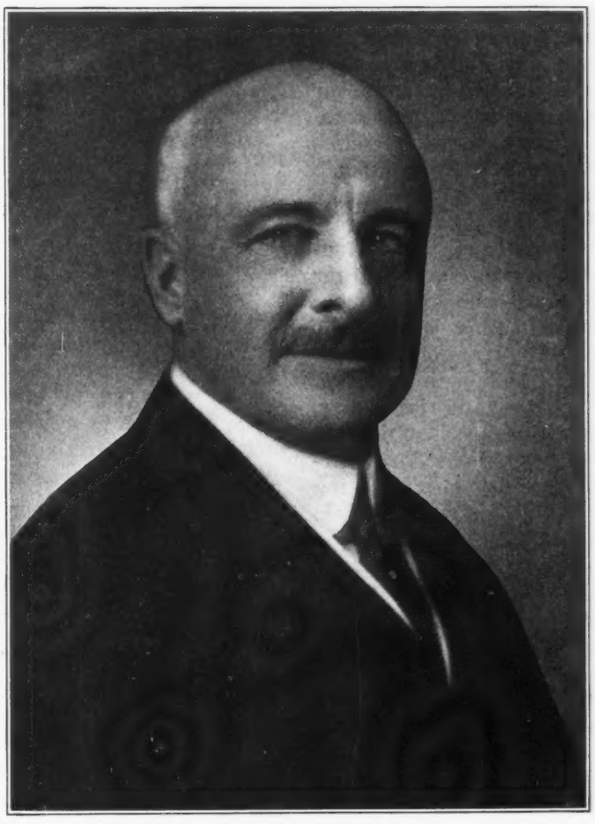
The situation is worth the attention of the mining industry for the reason that it introduces a new angle of an old game. In this case the prospect has some intrinsic value, but it is probably considerably less than $380,000, the sum for which it was underwritten. By questionable publicity it is being forced upon the public at an inflated value, the inflated value going to enrich the pockets of certain people who have little interest in the property as a mining proposition. Something for nothing. The public, or at least that part of the public that is not astute enough to distinguish an even break for its money, pays.

Mine Operators of Note

Walter Fitch, Sr.

BY GEORGE J. YOUNG
Western Editor *Engineering and Mining Journal*

A KEEN logical mind, close observation, and a knowledge of men and affairs, if coupled with initiative, constitute another recipe for success. Walter Fitch did not have a college education. Nevertheless he has made a success in the things he has attempted. Unlike some self-made men he is eager to concede the value of college training and has put his sons through that excellent institution, the Michigan College of Mines. In educating young engineers he believes that contact with bright minds is essential. He says "a man not possessed of an engineering education is unable to overrate its value." Walter Finch was born in London and had the usual education in the English private schools. He first went to work in a lawyer's office and then gravitated into the printers' and stationers' business. At the age of twenty, he became dissatisfied with the outlook that presented itself to him and decided to go to America. He went to Michigan and grubbed around in mines to secure a start. He accepted any employment that offered. At the end of five years he was superintendent of two mines and subsequently went from position to position as opportunity for advancement offered itself. In all he spent thirty years in the Michigan mines and as a result reached a high place in a mining region where there were many good men. At about the time he was thinking of retiring, he went to Utah. He became interested in the Tintic district and made a general study of mining conditions there. Securing the services of James R. Finlay, who, as Mr. Fitch said, knew more about "limestone mines" than he did, he made good use of that engineer's knowledge. With Finlay's help he visualized the geological conditions and formed definite opinions as to the continuity of the prevailing lines and zones of mineralization. Noting that the trend of these crossed some ground upon which a mine known as the Little Chief was operating with poor success, he interested himself in this mine. At the time the shaft of the mine was 800 ft. in depth and a large amount of work had been done west of a north-south line through the shaft. Despite twelve years' work and forty-three assessments, the mine had failed to find profitable ore in quantity. East of the shaft no underground work had been done, and Mr. Fitch reasoned that here was an excellent gamble. Half of the work had been done without success. There was only one other place to go. In spite of Mr. Fitch pointing out to the owners of the mine the conclusions of his studies, they were not enthusiastic nor did they at the time make any effort to follow them up. They finally asked Mr. Fitch to go in with them and test out his conclusions. Moved by the dominating motive of securing an opportunity for his two sons, who were completing their mining education, Mr. Fitch decided to go into the project. The general plan so roughly sketched out in the beginning was followed. Anticipation became a fact. The shaft was sunk from 800 to 1,400 ft. While sinking a crosscut was driven at the 1,000-ft. level and penetrated the ore zone. At this point no ore was discovered but the mineralized zone was definite. The 12th level yielded nothing. On the 14th level drifting was started upon the ore zone, and day by day the samples gave no encouragement, when one day a return of 1,700 oz. of silver per ton was received. A rich orebody had been discovered. This was in 1908, and since then a number of orebodies have been found. Up to the end of 1919 the amount of development totaled 125,038 ft. In 1909 the production was 75,849 oz. of silver, 120 oz. of gold and 146,028 lb. of lead from a total of 1,325 tons. In 1919 the production was 2,757,533 oz. of silver, 3,753 oz. of gold, 5,979,588 lb. lead, and 15,574 lb. of copper from 63,726 tons of ore. Walter Fitch had faith in his deductions. The mine which he was so fortunate in discovering is now being operated by his sons. Mr. Fitch believes in concentration of effort. He and his sons have settled in Utah, and are devoting themselves to Chief Consolidated.



WALTER FITCH, SR.

By The Way

Currency Exchange and Gold

In his account of travels and discoveries in North and Central Africa, from the journal of an expedition undertaken under the auspices of the British government in the years 1849 to 1855, Dr. Henry Barth made several references to the kinds of money used by the inhabitants of the regions extending from Tripoli southward. In describing a market place, he stated that though the women were profusely ornamented with strings of glass beads, the men were generally wearing a short black shirt and a small straw hat, their neck adorned with several strings of *kúngona* or shells. Continuing, he said "There is not at present any standard money for buying and selling; for the ancient standard of the country, viz., the pound of copper, has long since fallen into disuse, though the name, *rotl*, still remains. The *gábagá*, or cotton strips which then became usual, have lately begun to be supplanted by the cowries or *kúngona*. . . Eight cowries or *kúngona* are reckoned equal to one *gábagá*, and four *gábagá*, or two-and-thirty *kúngona*, to one *rotl*. Then, for buying larger objects, there are shirts of all kinds and sizes; from the *dóra*, the coarsest and smallest one, quite unfit for use, and worth six *rotls*, up to the large ones, worth fifty or sixty *rotls*. But, though this is a standard value, the relation of the *rotl* and the Austrian dollar, which is pretty well current in Bórnu, is subject to extreme fluctuation." Further on he says that Dr. Overweg, the geologist of the party, succeeded in purchasing a goat with his servant's shirt. "This article, even if much worn, is always regarded as ready money in the whole of Negroland, and as long as a man has a shirt he is sure not to starve." But what we started to tell about is that while exploring the headwaters of the Bénuwé River, south of Lake Tsád, Dr. Barth learned that the river carries gold in its sands. He made the discovery while bathing in the river, where the shelving bank and a swift current caused him to submerge involuntarily several times. The natives, as often as he dipped under water, cried out that he was searching for gold, the presence of which was known to them. Observing the shirtless condition of the doctor, and his dredging motions at intervals, their conclusion was both logical and obvious.

A Divining Rod With a Whang

It has taken C. A. Japhet, of Seneca, Kan., thirteen years to devise a magnet that is an infallible guide to the discovery of oil and gas wells, according to the *Seneca Tribune*. Though we would not belittle another's achievement, it seems that Mr. Japhet could have done as much in thirteen months. However, the instrument is said to be exceptional in that it will meet all the critical tests to which it may be subjected. It is described as a cone with a 4½-in. base and 7 in. high. A copper-coated plate surrounds the apex, reaching half way down the side. The cone is filled with chemicals whose nature, of course, cannot be divulged. "At the apex is a staple set in a leather whang. To the whang is tied a linen cord 9 in. long. At the end of the cord and supporting the cone so that it may swing freely is an ordinary clothespin." The whole thing weighs about 3 lb. and is seen to be quite simple in construction. According to Mr. Japhet, an oil pool or a gas pocket far below the surface of the earth causes this cone to swing in varying circles, though he admits he cannot tell why. The chemical combination inside the cone does the trick. Only one who has the gift of water-witching can work this magnet, says Mr. Japhet.

The Jack Pot Kitty

An interesting method of placer mining was proposed some years ago by an enthusiastic West Coast tourist or tropical wanderer, in the course of his efforts to interest a little development capital. Writing from the Republic of Potoma (sometimes referred to as the lost province), he expatiated on the advantages of La Recompensa mine, located on the Sisic River. His tale was almost literally as follows: "The Sisic River has been washing down mountains full of gold ore ever since Potoma exists, and there has been nothing done to it. The gold occurs in the plyers of the river, with 2 to 5c. gold in every shovelful. The river also has pusses every now and then, and the gold is washed down to the pusses, where it stays. La Recompensa mine holds two pusses, one 30 ft. deep and one 18 ft. deep. The Sisic River is 30 ft. wide on this mine and the pusses are situated between two mounds. It would be easy and inexpensive to build wooden flueses to carry water over the pusses. With the same water power a pump could be used to pump the water out of the pusses up to the bedrock; then smooth out the pusses with cement and put quicksilver on the bottoms, so in the rainy season we can take up the flueses and let the water that carries the gold run in again. So, every year we can pump it out and have a good deal of profit without any expense of labor." If the combing of the beaches or *playas* is done with a steam shovel, the estimate of values seems conservative. The mysterious "pusses" are probably *pozos* or potholes, popularly conceived to be repositories of untold wealth. Happy the man who may seek his hammock at the end of the dry season and enjoy an uninterrupted series of rummy siestas; while his faithful pusses purr contentedly as they seize the scurrying golden mice.

Relief for Magnesite Producers

We have been asked for the address of the gentleman who "recently wrote an article on the subject of manufacturing egg shells from magnesite." Our correspondent doubtless is thinking of the news item that we published in all seriousness some time ago to the effect that an official of a Washington magnesite company was giving his hens ground magnesite instead of lime, thereby improving the quality of the resulting eggshells, or so it was alleged. This may or may not be considered manufacturing, according to one's point of view. Possibly the magnesite is converted from the crude into the finished product on the hen's premises. On the other hand, the magnesite, which when pure is $MgCO_3$, may act simply as a pre-natal determinant or something of that sort. At present the Bureau of Mines has a co-operative agreement with the Northwest Magnesite Co., and it will be well if this subject is given careful study. One has only to consult the statistical reports of the National City Bank to learn the huge number of eggs laid in one year in the United States, and throughout the world, in fact. He will then see what a chance awaits the producer of magnesite.

CONSULTATION

United States Mining Laws

"I am interested in procuring a set of the mining laws of the United States, and have been referred to you as being able to suggest a proper reference. My idea is to have a pamphlet or small book, not one of those voluminous works on the thousand and one legal decisions rendered in mining litigation, but something giving all the laws."

An excellent paper covering the mining laws of the United States is issued by the General Land Office, Department of the Interior, Washington, D. C., and is entitled "United States Mining Laws and Regulations Thereunder." It is a 104-page pamphlet giving the laws and regulations regarding the reservation, exploration, location, possession, purchase, and patenting of the mineral lands of the public domain. No one interested in mining matters should be without it.

Although the pamphlet does not touch upon the interpretation which the courts have placed upon the various sections, clauses, and words of the legislation, it gives the groundwork of the country's mining laws. For a discussion of the working of the mining laws reference of course should be made to some work upon the subject, such as "Lindley on Mines," which is a voluminous compilation covering the interpretation of mining legislation by the courts.

For the mining regulations of the several states recourse can be had to the respective secretaries of state for information, as there are certain regulations which are subject to state control, such as the maximum width of a mining claim.

Besides the Congressional legislation enacted to cover the exploration of the public domain's mineral wealth, there are also the regulations of the various states covering principally safety work, mine inspection, and other matters concerning the operation of a mining property.

American Mining Capital in South America

"I am greatly interested in the extent to which American capital is involved in the development of South America's mineral resources (metallic), and would request you kindly to give me an estimate as detailed as possible covering the larger operations, with such other supplementary data as may make the matter more informative."

A surprisingly large amount of American capital is being employed in the development of South America's great mineral resources, and although it is difficult to obtain exact figures of the amount, an estimate can be readily made. With that idea in view, the following list of the largest and more important American mining and smelting companies in South American countries has been prepared, giving the capital invested in the operations and various outstanding features of each enterprise.

A conservative estimate of the total capital invested in the development of South American mines, disregarding the many millions of invested capital omitted from the table through lack of accurate information, would be $163,206,790. It would be safe to say that about $240,000,000 of American capital has found its way to South America.

The capital distribution so far as it can be ascertained is approximately as here noted:

Bolivia	
Guggenheim Brothers, 120 Broadway, New York, engaged in the development of tin properties. Capital engaged	(a)
International Mining Co., 7 Hanover Square, New York, owned by W. R. Grace & Co. and engaged in mining of tin and tungsten ores. Capital engaged	(a)
Chile	
Andes Copper Co., 42 Broadway, New York. A subsidiary of the Anaconda Copper Mining Co., developing an immense copper property in Chile. Capital	$50,000,000
Bethlehem Chile Iron Mines Co., 111 Broadway, New York. A subsidiary of the Bethlehem Steel Corporation, developing Chilean iron mines. Capital	(a)
Braden Copper Mines Co., 120 Broadway, New York. A subsidiary of the Kennecott Copper Corporation, with large copper holdings. Capital, approximately	$28,000,000
Societe de Minas y Fundiciones de Carrizal, owned by the American Smelting and Refining Co., and operating two smelting plants in Chile. Capital	(a)
Chile Copper Co., 120 Broadway, New York, a Guggenheim property developing an immense copper deposit. Capital engaged	$53,800,000
Fundicion de Guayacan, 61 Broadway, New York. A subsidiary of the American Metal Co., employed in copper smelting. Capital engaged	729,000
Santiago Mining Co., 42 Broadway, New York. A subsidiary of the Anaconda Copper Mining Co., developing Chilean copper properties. Capital	10,000,000
South American Metal Co., 61 Broadway, New York. A general trading company supervising exploration work in South America of American Metal Co. Capital	250,000
Colombia	
Breitung Mines Corporation of Delaware, 11 Pine St., New York. A holding company to own or control promising mining properties. Capital	1,127,790
Mammoth Gold, Silver, and Platinum Mines, Los Angeles, Cal. Placer holdings in Colombia. Capital	(a)
South American Gold & Platinum Co., 61 Broadway, New York. A holding concern for various shares of gold and platinum mining companies operating in Colombia. Capital	$ 9,500,000
Peru	
Cerro de Pasco Copper Corporation, 15 Broad St., New York. A large copper property in Peru. Capital engaged	49,000,000
Peruvian Copper & Smelting Co., 115 Broadway, New York. Development of copper-silver and silver-lead mines in Peru. Capital	4,600,000
Vanadium Corporation of America, 120 Broadway, New York. Extensive vanadium deposits in Peru. Capital	10,000,000
Total	$217,006,790

(a)—Information not available.

HANDY KNOWLEDGE

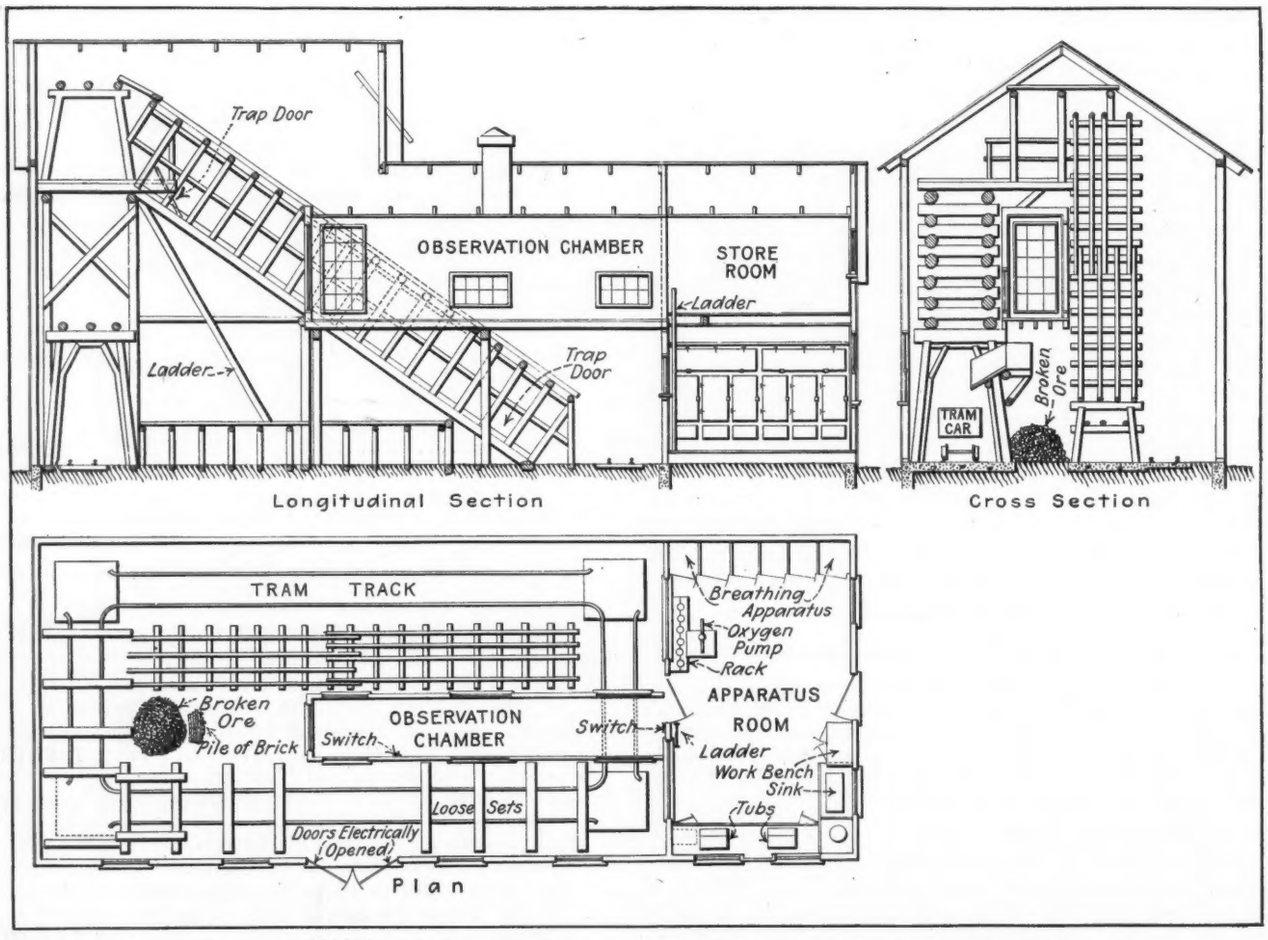
A Practical Mine Rescue Building*

BY R. H. SEIP

The first aid and mine rescue training quarters of the New Jersey Zinc Co. at Franklin, N. J., are shown in the accompanying sketch. This building was constructed for the purpose of securing for the men who are trained in mine rescue work, conditions similar to those met in the mine. The ground floor is divided into two rooms: an apparatus and instruction room 13 x 22 ft. and 8 ft. in height, from which a door gives access to the smoke room immediately adjacent to it, and the smoke room, 22 x 43 ft., varying in height from 20 to 28 ft., to permit the erection of the necessary timber. Double doors on one side open to the outside of the building. These doors are equipped with electric door openers, which may be operated from the apparatus room or the observation chamber. The doors are counterweighted, so that their operation in opening is entirely automatic. This feature, in addition to a window in the upper part of the building operated by a rope, provides for the rapid removal of fumes should an emergency make it desirable. The floor of the smoke room is cinder covered.

Above the apparatus room is a small storage room, from which an observation chamber projects into the smoke room for a distance of 24 ft. This is ventilated by a separate ventilator in the roof. Access to both the storage room and observation chamber is obtained by a vertical iron ladder from the apparatus room.

One end of the apparatus room is equipped with six vertical closets for the storage of the apparatus, each closet accommodating two sets of apparatus. Above these closets are two horizontal compartments for new first aid supplies, and below are six drawers for first aid practice materials and other useful paraphernalia. The opposite end of the room is equipped with two copper-lined wash tubs, an antiseptic solution container, and a white enameled sink. The drain boards of all of these receptacles are covered with sheet lead. Hot and cold water faucets are supplied for each tub and sink. A small work bench, with additional cupboards above and below the sinks, completes the equipment, with the



FIRST AID AND MINE RESCUE BUILDING OF THE NEW JERSEY ZINC CO., FRANKLIN, N. J.

*Abstracted from a paper, "Requirements of Rescue Training for Metal Miners," presented at the Ninth Annual Safety Congress of the National Safety Council, Milwaukee, Wis., Sept. 30, 1920.

exception of the charging pump and six oxygen tanks in a rack.

A standard mine car has been installed on standard mine tracks extending around the four sides of the room, with turnplates at each corner. On one side and end of the room are standard mine timber sets, four sets of which are loose for erection or removal in training. Over the rack a vertical cribbed raise has been constructed with a standard chute at the bottom for loading the car. At one side of the center of the room an inclined timbered raise or manway connects with a platform at the top of the vertical raise. Another means of access to this platform is by a ladder beneath the inclined raise to a trap door at the top. A low timbered passageway directly beneath the inclined raise is reached through a trap door at the bottom of this raise. The opposite end of the passageway is left open. Pipe lines have been installed for practice work, as well as the necessary tools, such as axes, hammers, bars, wrenches, and ropes. Smoke or fumes are generated by means of a smudge pot.

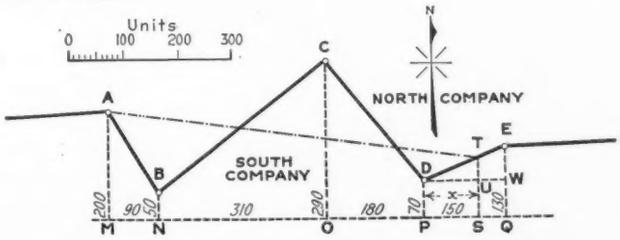
Straightening a Crooked Boundary

A Neat and Accurate Method of Solving a Troublesome Survey Problem—Mathematical Work Greatly Simplified

BY ALEX RICHARDSON[1]

Written for *Engineering and Mining Journal*

It is sometimes desirable, to facilitate surface or underground work, to smooth the zigzag outline of a joint boundary by substituting an equivalent straight line which will preserve the respective total areas intact. The problem is commonly solved by tedious trigonometrical methods; and the following solution is accordingly offered, as being equally accurate and far more simple:



The method is applicable to boundaries that have been established by chain and offset surveying, but in the case now to be considered it is assumed that the best modern practice has been followed, and that the co-ordinates of all the monuments are available.

CO-ORDINATES OF MONUMENTS

(In feet, yards, meters, or similar unit)

Monument	Latitude (Northing)	Departure (Easting)
A	700	1,000
B	550	1,090
C	790	1,400
D	570	1,580
E	630	1,730

Let *AT* be the desired line to straighten and equalize the irregular joint boundary *ABCDE*. It is required to determine the co-ordinates of the point *T*.

At any suitable distance from the boundary, here 200 units south of A, take an east-west datum line. The distance of this datum line from the east-west axis of co-ordinates is then 700 — 200 = 500. The distance *BN* is therefore 550 — 500 = 50; *CO* is 790 — 500 = 290, and so on.

The distance *MN* is departure of *B* — departure of *A* = 1,090 — 1,000 = 90; *NO* is 1,400 — 1,090 = 310, and so on.

Let x be the departure of *T* with respect to *D* = *DU*.

The latitude of *T* with respect to *D* = *TU*.

By similar triangles, *TU*:*DU*::*EW*:*DW*.

$$\text{Therefore,}\quad TU = \frac{x\,(EQ - PD)}{\text{dep. of } E - \text{dep. of } D} = \frac{x\,(130 - 70)}{1{,}730 - 1{,}580} = \frac{2x}{5}$$

$$\text{And } TS = PD + TU = 70 + \frac{2x}{5}$$

By the conditions of the problem, area of figure *MATS* = area of figure *MABCDTS*. Area of *MATS*

$$= (90 + 310 + 180 + x)\left(200 + 70 + \frac{2x}{5}\right)\frac{1}{2}$$

$$= 78{,}300 + 251x + \frac{x^2}{5}$$

Area of *MABCDTS* =

$$\left[(250 \times 90) + (340 \times 310) + (360 \times 180) + \left(70 + 70 + \frac{2x}{5}\right)x\right]\frac{1}{2}$$

$$= 96{,}350 + 70x + \frac{x^2}{5}$$

$$\text{Equating, } 78{,}300 + 251x + \frac{x^2}{5} = 96{,}350 + 70x + \frac{x^2}{5}$$

$$181x = 18{,}050$$

$$x = 99.72$$

$$\text{Latitude of } T \text{ from } D = \frac{2x}{5} = 39.89.$$

Total latitude of *T* = 570 + 39.89 = 609.89.

Departure of *T* from *D* = *x* = 99.72.

Total departure of *T* = 1,580 + 99.72 = 1,679.72.

CO-ORDINATES OF NEW MONUMENT

Monument	Latitude	Departure
T	609.89	1,679.72

The result can be checked by entering the value of x in the equation, and ascertaining if both sides agree. A more complete check is to calculate the areas of the two figures by means of the co-ordinates of their angular points; the results should balance. If the agreement is desired to extend to decimals, it may be necessary to carry out the value of x a little further. For ordinary tabulations of co-ordinates, however, two decimal places are usually sufficient.

DT, the distance to be measured along the line *DE* to fix the position of *T* on the ground, can be readily obtained from the right-angled triangle *TUD*, of which the sides *TU* and *DU* are known.

In the case of a boundary whose general trend is north-south, a north-south datum line would be taken. Whether to assume a north-south or east-west datum, what distance it shall be taken from and on which side of the boundary are matters of convenience for the surveyor to decide; the principle on which the solution is based is not affected thereby.

[1]The School of Metalliferous Mining, Camborne, Cornwall, England.

THE PETROLEUM INDUSTRY

Oil Shales of Indiana

Advantages of Location and Homogeneous Character of Raw Material Warrant Expectation of Commercial Possibilities When Experimental Data Determine Satisfactory Method of Recovery—Results of Dry and Steam Distillation Tests

BY JOHN R. REEVES
Indiana Geological Survey

Written for *Engineering and Mining Journal*

THERE is no doubt in the minds of those who have studied the status of the petroleum industry of the United States today that the increase in demand for gasoline, crude fuel oil, and lubricants cannot be met satisfactorily in the future unless recourse is had to other sources of supply than the present production from the oil fields. In the last few years attention has naturally been directed, as a means to relieve this situation, to the oil shales of this country. The success of this industry in Scotland has more than ever made this source of supply seem the logical successor to the waning oil fields. Much experimental work, both laboratory and commercial, has been done on oil shales of some of our Western States, and it seems eminently possible that they will soon be a reliable source of oil.

THE NEW ALBANY SHALE

In Indiana there is a large deposit of oil shale known as the New Albany shale. This body of shale is Mississippian and Devonian in age. The outcrop covers approximately five hundred square miles in Floyd, Clark, Scott, Jefferson, Jennings, and Jackson counties. The outcrop covers a strip of territory about fifty miles long and ten miles wide, from the Ohio River at New Albany north to North Vernon, in Jennings County. The shale lies practically horizontal, but actually dips to the west at the rate of thirty feet per mile. Near the western border of the outcrop the shale is thickest, in many places being more than one hundred feet thick. The total thickness of the shale is about one hundred and forty feet. From the western border of the outcrop the shale gradually becomes thinner toward the eastern border, where only the tops of the hills are capped with shale. The terrain of the area of the outcrop is rolling, but in places the shale stands in bluffs along the streams.

During the last year I have studied this formation and have collected a large number of samples, many of which have already been tested in the laboratory for their oil content as well as for the byproducts, ammonium sulphate and potash. In collecting the samples, a miner's pick was used to dig into the fresh shale, as the weathered shale on the face has lost much of its bituminous content. Each sample is a composite representative of the outcrop from which it was taken, as small parts of the sample were collected from each vertical six inches. Some samples were collected where the shale had been freshly blasted from a face and where wells were being dug, thus being representative of the shale that would be used in a plant operation.

The apparatus used in the determinations is the same as that designed by Woodruff and Day and used by the U. S. Geological Survey. (See Bulletin 641.) To compare the results obtained by dry distillation with those attained in using steam, this same retort was fitted so that steam could be used in the distillatory process. The results are given in gallons of oil, pounds of ammonium sulphate, and cubic feet of gas, per ton of shale. The table below shows the results obtained from samples taken at random. Results with and without the use of steam in distillation are shown.

INDIANA SHALE DISTILLATION WITH STEAM

Gallons of Oil	Cubic Feet of Gas	Pounds of Ammonium Sulphate	Per Cent Fixed Carbon	Per Cent Volatile Hydrocarbons	Per Cent Ash
10.00	997	28.5	6.25	12.84	80.91
12.75	912	22.2	8.50	13.14	78.36
18.00	1,836	20.4	6.90	22.81	70.29
9.50	570	38.4	8.00	10.90	81.10
9.50	886	35.5	4.00	9.50	86.50
16.50	1,350	22.4	7.90	18.00	76.40
12.00	980	24.0	8.30	10.40	81.30

DRY SHALE DISTILLATION

Gallons of Oil	Ammonia Liquor	Gallons of Oil	Ammonia Liquor
20	..	20	6
12	..	30	10
14	10	16	..
14	10		

From a commercial point of view there are several valuable features of these shales. In the first place, quarrying will be a comparatively simple matter and of the cheapest type. It may be done by blasting and steam shovel, the material being fed to the plant by gravity. The shale is so homogeneous in texture that the sorting out of foreign material will be practically unnecessary. It is much easier to crush than limestone, and as its hardness and other physical characteristics are the same throughout the formation, this will be an easy operation to handle. These shales do not coke in the retort, and the distillation may be carried on at a low temperature. Potash may be extracted by hot water and evaporation. A great and expensive acreage will not be necessary if the plant is built where the shale is thickest. There are several places close to railroads and water where there is ninety feet of shale above the level of a valley.

Although the Indiana shales are not as high in oil content as some others, the excellent yield of byproducts in the distillation, as gas, ammonium sulphate, and potash, as well as the valuable byproducts from the refining of the crude oil, the ease and low cost of mining, homogeneous character of the shale, good water supply, and very good railroad transportation will com-

pensate for this comparative deficiency. The retort that will be used will be probably one of a large capacity, simple but scientific in construction. This will have to be developed by experimental work on a commercial scale.

U. S. Oil Production for September Registers Decrease

Record Figures Shown in Monthly Consumption and Imports—California Takes First Place In Daily Production

THE following statistics of petroleum production in the United States east of California in September, 1920, and the two preceding months, based on reports filed with the U. S. Geological Survey, show the quantity of oil received from producers by pipe line and other marketing companies and by refineries that receive petroleum through private pipe lines or in tank cars directly from the wells. Data concerning oil consumed on the leases and producers' storage cannot be obtained in time for use in the monthly reports, but are used in compiling the annual figures showing production. The production reported for California is the average shown by figures collected by the Standard Oil Co. and by the Independent Producers' Agency and includes all petroleum brought to the surface.

PETROLEUM PRODUCED IN THE UNITED STATES IN JULY, AUGUST, AND SEPTEMBER, 1920.

(Barrels of 42 U. S. Gallons)

State	September, 1920 Total	September, 1920 Daily Average	August, 1920 (a) Total	August, 1920 (a) Daily Average	July, 1920 Total	July, 1920 Daily Average
California	9,128,000	304,267	8,997,000	290,226	8,583,000	276,871
Oklahoma	9,084,000	302,800	9,371,000	302,291	9,328,000	300,903
Central and Northern Texas	5,766,000	192,200	(b) 6,148,000	198,322	6,009,000	193,839
Coastal Texas	2,114,000	70,466	2,264,000	73,033	2,160,000	69,678
Kansas	3,629,000	120,967	3,721,000	120,032	3,621,000	116,806
Northern Louisiana	2,597,000	86,566	(b) 3,371,000	108,742	(b) 3,294,000	106,258
Coastal Louisiana	131,000	4,367	144,000	4,645	137,000	4,419
Wyoming	1,573,000	52,434	1,524,000	49,161	1,586,000	51,161
Illinois	903,000	30,100	924,000	29,806	925,000	29,839
Kentucky and Tennessee	772,000	25,733	775,000	25,000	749,000	24,161
West Virginia	672,000	22,400	688,000	22,194	673,000	21,710
Central and Eastern Ohio	453,000	15,100	469,000	15,129	461,000	14,871
Northwestern Ohio	187,000	6,233	189,000	6,097	196,000	6,323
Pennsylvania	626,000	20,867	640,000	20,645	650,000	20,968
Indiana	86 000	2 867	77,000	2,484	79,000	2,548
New York	78,000	2,600	76,000	2,451	80,000	2,580
Montana	37,000	1,233	(c) 9,000	290	8,000	258
Colorado	9,000	300	10,000	323	9,000	291
Total	37,845,000	1,261,500	39,397,000	1,270,871	38,548,000	1,243,484

(a) Revised. (b) Includes some petroleum drawn from producers' storage, which was produced in previous months but not heretofore credited to production. (c) Cat Creek field not included.

GAIN OF 353,000 BBL. IN AMERICAN STOCKS OF MEXICAN OIL

Production of petroleum during September, amounting to 37,845,000 bbl., decreased slightly, the daily average being 1,261,500 bbl., as compared with 1,270,871 bbl. in August. Consumption, however, increased to the record figure of 48,670,000 bbl. The deficiency in domestic production was offset by net imports of 10,914,000 bbl., the largest ever recorded in a single month, so that, although there was a decrease of stocks of domestic petroleum of 264,000 bbl., there was a gain in stocks of Mexican petroleum held by importers of 353,000 bbl. Therefore, estimated consumption during September was slightly less than the domestic production plus imports, a condition which has existed since June.

The slight decrease in production recorded for September is due to decreased returns from central and north Texas and north Louisiana. The decrease in both states, however, was more apparent than real, because production for August was credited with some petroleum drawn from producers' storage but produced in previous months and not heretofore credited to production. Increased production is reported for the other states, excepting Colorado. California attained the record daily production of 304,267 bbl., supplanting Oklahoma as first in rank. The report of production from the Cat Creek field, in Montana, places that state ahead of Colorado.

DOMESTIC PRODUCTION SHOWS INCREASE

The net decrease of domestic stocks was contributed to by withdrawals from stocks of California, north Louisiana, and Appalachian grades. The continued increase in stocks of Mexican petroleum held by importers reflects the increased imports.

During the first nine months of 1920 domestic production increased in round numbers fifty million barrels compared with the first nine months of 1919, and imports increased thirty million barrels. This record indicates that production plus imports in 1920 will exceed five hundred and twenty-five million barrels. In view of the greatly increased consumption, however, it is not yet evident whether the increased supply will make possible a net addition to the stocks on hand by the end of the year.

Petroleum Refining in Dutch West Indies Exhibits Important Development

The most important industry of the Dutch West Indies, according to Consul William Bardell, is the refining of petroleum at Willemstadt, where the plant of the Curacao Petroleum Co. keeps more than 1,000 hands employed. The establishment up to this time has cost nearly $2,000,000. This company for a while was greatly handicapped in obtaining crude oil from its wells in Venezuela, because of the lack of appropriate vessels. This difficulty, however, has now been practically overcome, and the refinery receives large quantities of crude oil, not only from its own wells in Venezuela, but also from Mexico.

The plant is at present working day and night. Machinery for the manufacturing of tin cans to hold the gasoline has recently arrived from the United States, and the company hopes, within a short time, to be capable of turning out about 5,000 cans of gasoline daily, which it expects to sell to all of the West Indies and the northern part of South America. Many oil-burning vessels now stop at this port for fuel oil furnished by this company.

NEWS FROM THE OIL FIELDS

Cat Creek Field Output Estimated at 10,000 Bbl. Daily

From Our Special Correspondent

The Frantz Corporation, operating in Cat Creek field, Montana, recently brought in a third well, an offset to its No. 2, showing a flush output of 2,000 bbl. The Frantz, Mid-Northern and Forbes interests also brought in a well with a flush output of 1,500 bbl. Output of the Cat Creek field now is approximately 4,600 bbl. daily, not including the production of the last two named wells, and the field now is estimated to have a capacity for an output of 10,000 bbl. daily, which is larger than that of the Salt Creek field, in Wyoming. The well being drilled by the Anaconda Copper interests has a production of 150 bbl. and the deeper sands have not yet been reached. The Carter Oil Co., a Standard Oil subsidiary, has started drilling in the Duck Creek section, near Billings, Mont., and has reached a depth of several hundred feet with a 22-in. hole. It is proposed to go at least 4,000 ft. here in exploratory work, and about 3,000 ft. of casing is already on the ground. The size of the well is larger than the general run of wells being drilled. The Dutch Shell interests also have representatives in the Cat Creek field.

Oil Prospectors Seeking Claims in Arctic Country

From Our Special Correspondent

As a result of the oil strike at Norman, at the confluence of Great Bear River and Mackenzie River, N. W. T., by the Imperial Oil Co., several parties are leaving Edmonton by dog team for the new field, to stake claims in advance of the other prospectors who will go north by the river route in the spring. Owing to the prospective rush of next season, all available berths on steamers plying to the north have already been reserved. The prospectors now starting out with a view of reaching Norman this winter are likely to be turned back by the Mounted Police at Fort Smith, on the Slave River, unless they can show that they have sufficient food supplies and are otherwise equipped to encounter the severity of the Arctic winter.

Shortage of Oil-Well Equipment Hampers Production

With the advent of the recent land-leasing bill additional petroleum production may be looked for provided the operators can secure the necessary equipment to drill, according to the Independent Oil Producers' Agency. Owing to the enormous demand for drill pipe and casing in Texas, Wyoming, and other fields, California has experienced difficulty in getting needed supplies. The American Petroleum Institute has secured through the Interstate Commerce Commission the allotment of sixty cars per day for the shipment of oil-well material from the mills to the fields. This co-operation should ameliorate local conditions to some extent, but California is in dire straits, due to an insufficient supply of material at a time when it is needed most. If this allotment is maintained there remains but one other factor: Can the mills supply the needed equipment? If they cannot, conditions must be remedied immediately by expansion and the output increased.

So acute has this shortage of oil-well equipment become that casing and material of wells which do not net a fair return because of the present insufficient price of oil are being used in further development work.

Completion of Bowling Green Refinery Expected Jan. 15

From Our Special Correspondent

Shipment of material for the new 1,500,000 bbl. refinery at Bowling Green, Ky., is rapidly progressing. Completion is expected by Jan. 15. This refinery has contracted for 2,000 bbl. of crude daily, with options on 2,000 bbl. more, as it is expected that the refinery will have to be enlarged.

Well No. 6 on the John Covington lease, estimated at 100 bbl., between the Three Springs and Nashville pikes, Warren County, has been completed. The five other wells on this lease are producing. Well No. 2 on the Brownfield lease, west of Bowling Green, flowed twice last week. It is estimated that this well will produce between 50 and 60 bbl.

The White Plains Oil Co. has a well on the John Strait lease in the Halifax pool of Allen County, pumping 100 bbl. The well on the Bailey lease, shot last week, is reported by Joe Hieatt good for 250 bbl.

September reports show Lee County still head of the production column with 443,157 bbl.; Estill, 97,667; Allen, 74,009, and Warren County, 44,454 bbl.

Blue Ridge Tracts Bring High Figures for Texas Leases

From Our Special Correspondent

Blue Ridge, Fort Bend County, Tex., is now attracting more attention than any other Gulf Coast oil field. First, the Gulf Production Co. brought in two wells on the northeast side of the dome, and these were followed by the Texas Co.'s No. 1 Robinson on the west side, flowing several thousand barrels a day initial production. This well, following the completion of the Gulf Co.'s producing wells, indicates the possibility of a large acreage of oil-bearing territory; at least, the oil scouts believe so, and leases on tracts of any acreage are in demand.

One of the largest deals reported so far was on a seventeen-acre tract divided into one-acre lots adjacent to the Texas Co's No. 1 Robinson. Prices for the leases, it is stated, ranged from $10,000 to $17,000 per acre bonus plus one-sixth royalty.

Successful Cementation Completed in Wyoming

From Our Special Correspondent

Well No. 30 of the Buck Creek Oil Co. in the Lance Creek oil field, Wyoming, which was cemented a short time ago by Government cement experts in an effort to cut off the water, is now flowing about 300 bbl. of oil per day, with no water. No. 38 well, an offset to No. 30, has since been cemented and is ready to be drilled in.

The company will conduct other drilling operations in the Lance Creek field. Its total production from this field is now 460 bbl. daily. Since the discovery of oil in the southeast anticline of the Mule Creek oil field, it is believed that deeper drilling in the western and more prominent anticline will show oil to exist there in the Dakota sandstone. The wells of the Mule Creek field are small producers, 150 bbl. a day being about a maximum, but the oil is of high grade.

Salt Water Intrusions on Lot 114

From Our Special Correspondent

The week ended Oct. 23 has proved to be one of the most important in the history of the Mexican oil fields. In the last seven days no less than five gushers have been reported to be showing signs of the intrusion of salt water. The center of action is the lower Chinampa field, in the vicinity of the famous Lot 114. (This lot contains more huge gushers than any other piece of land of its size in the known oil world.)

Thompson's No. 1 has been entirely closed in, due to the high percentage of water. The well was brought in about the first of the year, and has been flowing between 30,000 and 40,000 bbl. every day since that time. The Union Oil Co.'s well, also on Lot 114, has been showing salt, and will soon be shut down. This well was completed on July 17 and was rated at 85,000 bbl. daily production.

Other wells reported to have gone to salt are owned by the International Petroleum Co., the Texas Co., and the Freeport Mexican Petroleum Co., with an aggregate production of 200,000 bbl. per day. The salt-water intrusion on Lot 114 is not dampening the efforts of the drillers on that lot, as no fewer than ten wells are being rushed to completion.

Book Reviews

The Manufacture of Sulphuric Acid in the United States. By A. E. Wells and D. E. Fogg. Paper, 6 x 9; pp. 216. Published as Bulletin 184, Bureau of Mines, and obtainable from the Superintendent of Documents, Washington, D. C., for 40c.

This is a more pretentious book than many of the Bureau publications. Although not to be compared, of course, to the classic work of Lunge on this subject, it is an excellent review of recent developments in the industry and of the equipment and methods used in sulphuric-acid manufacture. A discussion of the supplies of sulphur-bearing raw materials and mention of the uses of the acid are included. The information given is generally known among acid manufacturers, for it was obtained from them, and confidential matter of course has not been published, but others will find much that is new and of interest. It should make an excellent college textbook.

Sulphuric acid is being made from roaster gases at the following copper smelters: Garfield Smelting Co., Garfield, Utah; Anaconda Copper Mining Co., Anaconda, Mont.; American Smelting & Refining Co., Perth Amboy, N. J.; Mountain Copper Co., Martinez, Cal.; and Calumet & Arizona Mining Co., Douglas, Ariz. Waste gases from copper blast furnaces are used at the Tennessee smelters of the Tennessee Copper Co., and the Ducktown Sulphur, Copper & Iron Co. At all of these plants the chamber process is used; in fact throughout the country, except in the South, chamber plants outnumber those using the contact process two to one. In the South, every plant—and there are nearly a hundred, with the exception of a government powder plant at Nashville, Tenn.—uses the chamber process. Most of the patents for the contact process will expire in 1923, and after that time that process may increase in popularity, as it produces acid more economically, although requiring highly trained operators and pure ores.

We understand that no free copies of this book are available. E. H. R.

"The Limestone and Phosphate Resources of New Zealand." Part I, Limestone, by P. G. Morgan, New Zealand Department of Mines, Geological Survey Branch. Bulletin No. 22 (new series). Wellington. 1919, 11 x 8½ in., 316 pp. 14 plates, 6 text figures, 2 maps.

The chief purpose of the report is to describe limestone deposits that may be used for agricultural purposes. The application of lime and limestone to the soil, and problems relating thereto, are given in detail. The remainder of the introductory part is devoted to a discussion of the constituents of limestone, chemical composition, geology, origin, and sampling. On pages 35 to 289 detailed description is given of the limestone deposits by counties. The descriptions are comprehensive and include numerous chemical analyses, but many of the limestones described are very impure. The author emphasizes the broad field to be covered in a bulletin of this character, and, assuredly, the task is so tremendous that one is led to question the wisdom of including with it, as the author does, an elementary treatise on chemistry and geology. O. B.

Graphite. By Hugh S. Spence, M.E. Paper, 202 pp., 56 plates, 43 figures, 6 maps. Mines Branch, Department of Mines, Ottawa, Ont.

During the war attention was directed to graphite to a greater extent than in former years, and the belligerents sought information in regard to their available resources of this mineral. In Canada this led to the restudy of the graphite deposits and the preparation of a new report to replace that of F. Cirkel, published in 1907, and now out of print. The work has been well done by Mr. Spence, and the comprehensive report on the various phases of the graphite industry will be much appreciated.

The introductory chapters consist of discussions on the history, properties, geologic occurrence and origin of graphite. Other general chapters describe the uses of graphite, the manufacture of the artificial variety, the occurrence of graphite in foreign countries, and methods of analysis of graphite and its ore. The more specific portions of the report are concerned with its various occurrences in Canada and of the processes employed in concentrating and refining the graphite flake.

The principal deposits of Canada lie within the provinces of Ontario and Quebec, although some graphite, mainly of the amorphous variety, occurs in British Columbia, New Brunswick and Nova Scotia. Graphite mining was first carried on in Quebec, where a deposit was worked about 1846; not until 1870 was any mining done in Ontario. Since then numerous deposits in these two provinces have been worked intermittently, but the industry has never attained much prominence and most of the projects have been unsuccessful. The most common modes of occurrence are in the form of disseminated flakes in the sillimanite gneiss or in the crystalline limestone. The ore which has been worked is said to contain from 10 to 20 per cent graphite, and there are undeveloped deposits of lower grade but as rich as many of the deposits that have been worked in other countries.

The numerous methods and machines employed in the concentration of the flake graphite are clearly described. Many typical flow sheets are given. The author concludes that "frothing oil flotation would appear to offer the cheapest and most efficient means of concentrating graphite that has yet been devised," a conclusion that seems to be in agreement with the opinions of the majority of the graphite producers at the present time. B. L. M.

Technical Papers

Requests for papers herein mentioned should be addressed to the publisher, whose address, together with the postpaid price, is given when it is known.

British Statistics—Production and accident statistics for the mineral industry of Great Britain and Ireland for 1919 have been published (twenty-five pages), and can be obtained from H. M. Stationery Office, 28 Abingdon St., London, S. W. 1, for 3s.

Oil Shale — *The South African Journal of Industries* (Pretoria, price 6d.) in its August issue, contains an article entitled "An Oil-Shale Industry for South Africa," by T. G. Trevor, Inspector of Mines, at Pretoria. This paper outlines the occurrences of oil shales in the Wakaerstroom and Ermelo districts and gives some economic facts concerning the activities of the African Oil Corporation in the former district.

A. A. E.—The *Arizona Mining Journal* (Phoenix, Ariz., price 25c.) devotes the greater part of its October issue to the activities and purposes of the American Association of Engineers. The growth of this organization among mining men, particularly in the Southwest, is notable. Articles prepared by C. E. Drayer, Secretary of the A. A. E.; Bradley Stoughton, of the A. I. M. E.; G. M. Butler, E. B. Miller, and Leroy K. Sherman are included.

Power Plants—The new 7,000-hp. steam power plant of the Associated Smelters, at Port Pirie, South Australia, is described in a six-page article in *Chemical Engineering and Mining Review* for September (Melbourne; price 11d., post free). The description will be of interest to American smelter power-plant designers in the opportunity which it gives to compare ours with the latest Australian practice. Two Fraser and Chalmers Rateau blowers, each having a capacity of 32,000 cu.ft. of free air per minute at 5 lb. pressure, and one Parsons turbo blower, with a capacity of 36,000 cu.ft. at 4 lb. pressure, furnish air for the furnaces.

Flotation at Anyox—P. E. Peterson, superintendent of concentration at the Granby mill, at Anyox, B. C., has a four-page paper in the *Bulletin of the Canadian Institute of Mining and Metallurgy for October* (Drummond Building, Montreal), on flotation practice at that mill. An unusual feature is that 19 per cent of the flotation feed is coarser than 40 mesh. To handle this coarse feed the Peterson flotation machine has been devised and is illustrated. Air is admitted through a porous hose instead of a flat canvas mat.

Oklahoma Oil—Bulletin 686-X of the U. S. Geological Survey, Washington, D. C., is an eight-page pamphlet describing the structure and oil and gas resources of the Osage Reservation.

ECHOES FROM THE FRATERNITY

Hydro-Electric Power to Play Large Part in Future of South America's Mining Industry

The great potential water power of South America and the projects to develop it by hydro-electric power plants which will supply energy to furnaces, railways, and metallurgical works is discussed in a recent bulletin by the Guaranty Trust Co.

In Argentina the Iguazu of the northeastern corner of the country and the great group of water-power resources in northwestern Patagonia, Neuquen, Rio Negro and Chubut, are capable of producing enormous quantities of hydro-electric power. The falls of the Iguazu afford the best single resource in Argentina and one of the best in the world. Accordingly, the Argentine government is making a preliminary survey for a power plant there. An international power plant, with a capacity of 150,000 hp., will be erected jointly by the governments of Argentina, Uruguay and Brazil. At present La Compañia Hidro-electrica de Tucuman (English) is the only power plant actually established.

Brazil has extensive plans for the development of interior transportation, including the construction of power plants for industries and the electrification of railways. A power plant of 30,000 hp. is to be built on the river Jacuhy, under a thirty-year concession, at the expiration of which the state will take over the installations. Rio de Janeiro is to have a 270,000-hp. plant in the near future by an international company with American interests.

The Itabira Iron Ore Co., Ltd., recently secured a concession from the Brazilian government to construct and exploit high-temperature furnaces, a steel factory, reducing and like apparatus, and plans to electrify the Victoria-Minas railway. An electric smelting plant, the first of its kind in South America, will be built in Ribeiro Preto, Province of São Paulo, by the Companhia Electrica Metallurgica Brazileira. The construction of the mill, seventy-five miles from the iron mines of Minas Geraes, will be started as soon as the American contractors can get their engineers on the ground.

Bolivia is a country of mines, though other resources exist, and the present field for street railroad and power transmission material is restricted. The greatest hydro-electric resources are those in the vicinity of La Paz, Tres Cruces, and Colquechaca, and plans for their exploitation have been made. The three initial power plants will entail an expenditure of $10,000,000 and will require large quantities of other machinery and electrical accessories in addition.

The La Paz-Yungas government electric railroad now being constructed, the Corocoro copper mines and the city of La Paz will use power from the Yungas River near La Paz. The progressive mining section of Tres Cruces requires power and tramways; the wealthy mining district of Colquechaca lacks electric power and needs to extend the railway to Uncia, another mining center.

Hydro-electric power is beginning to be utilized by the tin and copper mines of Bolivia. The Guggenheims of New York have acquired rights to three tin mines, comprising more than 4,000 h., in the Department of La Paz. Water and power rights to some six streams in the vicinity of the mines have been secured, and a hydro-electric power plant is to be built, and an electric smelting plant is under consideration.

The Bolivian Government has been for some time contemplating the electrification of all railways and has declared as public domain the waters of rivers with power possibilities.

In Peru most of the important cities and towns have electric light and power systems. Various sections of the Peruvian railways also are being electrified, especially the interurban lines near Lima. The mines of Peru are beginning to appropriate the hydro-electric resources of the Peruvian Andes. The Cerro de Pasco Copper Corporation of Cerro de Pasco is now installing a large up-to-date smelter at Oroya and providing modern facilities for its workmen. A vanadium ore-reducing plant for the mines of Minasgra is to be built at Jumasha, Peru, by the Vanadium Corporation of America, of Pittsburgh, Pa. A 20,000-kw. hydro-electric plant for treating the ore is to be constructed about twenty-five miles from Jumasha.

In Ecuador public utility development has been very slow. Chile has vast hydro-electric resources, which have been only slightly developed, chiefly by German and British capital. The Chilean Government will electrify all the state railways. An international company (Anglo-Chileno-Americano) in Valparaiso plans a 100,000-hp. power plant for that region, and the British-owned Antofagasta-La Paz Railway in the nitrate region of northern Chile is to electrify its lines at a cost of $7,500,000, which will call for a power plant.

Colombian cities are becoming modernized with the development of Colombia's industries, and her mineral resources are being exploited actively.

A number of the larger Venezuelan cities and towns have electric lighting and tram service, and the Caroni Falls will be harnessed to provide power for the new electric railway from San Felix, on the Orinoco River, to the Guasipati goldfields.

Gold and Silver Questions Discussed by Butters, Lawrie and Other A. I. M. E. Members

The regular monthly meeting of the New York Section of the A. I. M. E., held at the Machinery Club on Nov. 4, heard addresses by Charles Butters on "How Can We Stimulate the Demand for Silver?" and by H. N. Lawrie, of the American Mining Congress, on "The McFadden Bill."

Mr. Butters called attention to this innovation in Institute discussions, urging a wider interest among mining men in matters affecting markets. Drawing on his own extended experiences in silver mining in Mexico, he recalled the difficulty Mexican mine managers had in obtaining silver to pay their labor and the advisability of increasing the supply of Mexican silver pesos. He advocated a silver producers' association and made an estimate that the world's silver consumption in 1920 would greatly exceed the production.

Mr. Lawrie outlined the purposes and proposed working of the McFadden Bill and was kept busy replying to many interrogations regarding its operation. W. C. Ralston, A. J. Clark, Kirby Thomas and J. E. Spurr were all called on for a discussion. Mr. Spurr pointed out the difficult position of gold and silver producers—they had to study a combination of marketing and monetary problems which led them into all sorts of difficulties. He emphasized the wide divergence of opinion in banking and economic circles regarding the status of the precious metals and the McFadden Bill and the tremendous importance of the gold reserves in the world. D. M. Liddell deplored the lack of general propaganda behind the McFadden Bill as compared with strength of the propaganda opposing it.

Whence France Draws Her Fuel

The French Minister of Public Works has published the following figures, according to *L'Echo des Mines et de la Metallurgie*.

The total coal production by France between Jan. 1 and July 31, 1920, amounted to 13,246,339 tons (of 1,000 kg.) including 12,695,193 tons of soft coal and 551,146 tons of lignite. During the same period her fuel importations amounted to 13,700.079 tons coal, 2,317,412 tons of coke and 1,005,775 tons as follows:

	Coal	Coke	Agglomerate
Saare	2,581,819	.....	.....
United Kingdom	7,771,338	550,183	541,257
Belgium	686,554	.....	.....
U. S. A.	612,919	.....	.....
Germany	1,990,255	1,690,409	332,870
Other countries	57,194	.....	.....

MEN YOU SHOULD KNOW ABOUT

Arthur E. Kitts is leaving the Isle of Man as conductor of a mining expedition to the southern Sudan.

John H. White, of Denver, Col., has been making examinations in the old Steeple Rock district in western New Mexico.

R. L. Chase, mining engineer of Denver, Col., is spending November in oil-shale work at Grand Valley and De Beque, Col.

Donald M. Liddell, metallurgical engineer, has moved his offices to Room 330, No. 2 Rector St., New York City.

Stewart Campbell, mining engineer and United States mineral surveyor, of Hailey, Idaho, was elected Idaho State Mine Inspector on Nov. 2.

Dr. Henry Mace Payne, formerly assistant to the president of Bertha Coal Co., is now associated with Andrade-Eyre, Inc., 80 Broadway, New York City.

Spencer C. Browne and **Karl F. Hoffmann**, consulting mining engineers, have both opened offices at 2 Rector St., New York City.

F. H. Moffit has returned to Washington after five months' geological field work on the western shore of Cook Inlet and in the Copper River region of Alaska.

H. Foster Bain, formerly of U. S. Bureau of Mines, who has been doing consulting work in China, is returning to the United States. He is expected early in December.

Frank L. Hess, geologist of the U. S. Geological Survey, who went to South America last December on a special mission, has returned to Washington.

Fred B. Ely, of Fort Worth, Tex., is leaving for a stay of several months in northeastern Mexico. Mr. Ely will examine a considerable area in that section for its possibilities in oil and natural gas.

Andrew M. Fairlee, chemical engineer, of Atlanta, Ga., and specialist in sulphuric acid, has been retained by the Baugh Chemical Co., as consultant in connection with the operation of its acid plants at Baltimore, Md.

Walter E. Clark, president of the University of Nevada, was in Washington recently in connection with the co-operative work which the University of Nevada is carrying on in connection with several of the Federal bureaus.

Louis D. Huntoon, mining engineer, of 115 Broadway, New York City, and **G. D. Van Arsdale**, now of Los Angeles, Cal., have formed the partnership Huntoon & Van Arsdale, consultants in mining, geology and hydro-metallurgy.

V. Dolmage, of the Geological Survey of Canada, recently completed geological field work from Barclay Sound north to Quatsino that makes possible a geologic map of the whole of the west coast of the island of Vancouver, B. C.

R. C. Emmons, a graduate in geology of the University of British Columbia and assistant geologist with Dr. V. Dolmage on the west coast of Vancouver Island, is taking a post-graduate course in geology at the University of Wisconsin.

Walter Harvey Weed, geologist and mining engineer, announces that he has severed all connection with Harris & Co., stockbrokers, 25 Broad St., New York City. Mr. Weed's addresses are Tuckahoe, N. Y., and 29 Broadway, New York City.

M. W. Potterfield, who has charge of the Boston Hill manganese properties at Silver City, N. M., is making an exhaustive study of the manganese situation in the East, as it applies to the grade of ferromanganese ores mined on his properties.

A. T. Thompson, assistant to the president in the east; **P. G. Beckett**, general manager, and **Gerald Sherman**, consulting engineer, of the mines department of the Phelps Dodge Corporation, are inspecting company properties in the Southwest.

O. B. Perry, general manager of the Yukon Gold Mining Co., a subsidiary organization of the Guggenheim interests, returned recently from a visit to the company's mining properties in the Mayo district and near Dawson, both in the Canadian Yukon.

H. E. Bierce, formerly managing director of Gibson Consolidated Copper Co., Bellevue, Ariz., announces that he has resigned to assume charge of the mining department of Wellman-Lewis Co., engineers, of Los Angeles, Cal. His address is 900 Hibernian Building, that city.

L. E. Ives, formerly business manager of *Engineering and Mining Journal*, and more recently assistant advertising manager for the Penton Publishing Co., is now manager of sales for Clement K. Quinn & Co., miners and shippers of iron ores, Kirby Building, Cleveland, Ohio.

Frank M. Sylvester, of Vancouver, B. C., formerly general manager for the Granby Con. M. S. & P. Co., has been appointed president of the Moose Group Mining Co., owning mining property situated in Alice Arm district, British Columbia. P. W. Racey is in charge of mining operations.

John Borg, of New York, president of the Consolidated Interstate-Callahan Mining Co, recently spent two weeks at Wallace, Idaho, familiarizing himself with the company's operations. This is his first visit since his election to the presidency of the company, succeeding the late John A. Percival.

C. W. Purington, consulting mining geologist, wrote under date of Oct. 3, at Hakodate, that during the summer he had examined a quartz gold mine in Japan, visited the goldfields of the Kuktui near Okhotsk, and had been wrecked off Sakhalin. His address is now 5 Sodomsky Pereulok, Vladivostok, Russia.

Prof. R. W. Brock, of the University of British Columbia, formerly director of the Geological Survey of Canada, has returned to Vancouver, B. C., after having made a geological and topographical survey of country west of Burns Lake, near the Grand Trunk Pacific Railway, in the interior of British Columbia.

Kirby Thomas, consulting mining engineer, has returned to New York City after several weeks spent in Colorado, examining mining properties in San Juan district and in Gilpin County, and in investigating the uranium and vanadium deposits of Utah and Colorado and the oil-shale deposits and processes in western Colorado.

Gilbert H. Cady, geologist with the Geological Survey of Illinois for some years, and recently returned from a year spent in professional business in the Far East, has been appointed professor and head of the department of geology of the University of Arkansas, at Fayetteville, Ark. He also becomes State Geologist of Arkansas, succeeding N. F. Drake.

J. D. MacKenzie, who succeeds the Deputy Minister of Mines, Charles Camsell, as head of the British Columbia branch of the Geological Survey of Canada, was graduated in mining engineering from the Massachusetts Institute of Technology in 1911, and five years later received the degree of doctor of science from the same institution. He recently returned to Vancouver, B. C., after having spent three months investigating iron-ore deposits in the Taseko Valley and Bridge River regions of the province.

OBITUARY

Thomas W. Clarke, mining engineer, who went to Tampico, Mexico, last spring in the interest of the Standard Oil Co., died there on Oct. 27 from malaria, according to word received Nov. 2 from the Mexican government. Mr. Clarke, who was only forty-seven years old, had resigned from U. S. Shipping Board to accept this mission to Mexico.

Alexander J. McCone, of Los Angeles, Cal., founder and president of the Fulton Engine Works there, died in San Francisco on Oct. 26, at the age of sixty-one. Mr. McCone was also one of the founders of Harron, Rickard & McCone, of San Francisco. He and his father were pioneers of the Comstock district, Nevada, where the father built the first foundry, afterward merged with Nevada Engineering Works of Reno, Nev. About ten years ago Alexander was Speaker of the House of the Nevada Legislature, and five years ago he moved to Los Angeles, Cal.

THE MINING NEWS

The Mining News of ENGINEERING AND MINING JOURNAL is obtained exclusively from its own staff and correspondents, both in the United States and in foreign fields. If, under exceptional conditions, material emanating from other sources is published, due acknowledgment and credit will be accorded.

LEADING EVENTS

Many Speakers Scheduled for Mining Congress Convention

Representative L. T. McFadden To Talk on Gold Question—Taxation, Flotation and Standardization To Be Discussed

At the convention of the American Mining Congress to be held at the Albany Hotel, Denver, Col., Nov. 15 to 20, the industrial situation will be discussed by speakers of national prominence, among whom are Governor Henry J. Allen, of Kansas, whose subject will be "The Right of Labor to Strike"; and Dr. Charles A. Eaton, editor of *Leslie's Magazine*, who will have as his topic the "Present and Future Relations Between Labor and Capital." James Lord, president of the mining department of the American Federation of Labor, will speak on "Organized Labor and Its Attitude in the Present Industrial Crisis"; Charles A. Chase, on "The Colorado Open Shop Declaration"; and Senator Charles S. Thomas, on "Industrial Honesty." Carl Scholz, at one time president of the American Mining Congress and now manager of the Raleigh-Wyoming Coal Co. of West Virginia, will discuss the recent decision of the Appellate Court of West Virginia through which the historic permanent injunction was issued restraining the United Mine Workers of America from pernicious activity within the jurisdiction of that court.

The Gold Conference will have an equally interesting list of speakers, including Congressman Louis T. McFadden, whose subject will be "The Financial Reconstruction of the Nation." Among the other speakers are Governor Emmet D. Boyle, of Nevada; Hon. Fletcher N. Hamilton, State Mineralogist of California; Dr. Milnor Roberts, dean of the College of Mines, University of Washington; Dr. Henry M. Fox, director of the Oregon Bureau of Mines and Geology; George E. Collins, of Denver, governor of the Colorado chapter of the American Mining Congress; B. C. Yates, superintendent of the Homestate Mining Co. at Deadwood, S. D., and Dr. Harold N. Lawrie, chief of the division of rare and precious metals of the American Mining Congress.

The Tax Conference will be in charge of Robert G. Wilson, director of the tax division of the American Mining Congress, and a committee, composed of Paul Armitage, of New York, chairman of the tax committee of the Mining Congress; Dr. R. C. Allen, vice-president of the Lake Superior Iron Ore Association, Cleveland, and Dr. George E. Holmes, author of "Holmes on Taxation." It will take the form of a "round table" discussion.

On the general program of the convention, H. J. Pierce, of Seattle, will speak on "The Utilization of Western Water Power," and Edwin Terrell, executive director of the Water Power League of America, will discuss "The Reduction of Mine Operating Cost Through Use of Mountain Streams." General L. C. Boyle, former attorney general of Kansas, will speak on "The Effect on the Western Industry of the New Freight Schedules Recently Adopted."

There is also an interesting list of speakers on the subject of oil flotation, including Gilbert H. Montague, of New York, and George L. Nye, attorneys for the American Mining Congress, and Alfred D. Cook, director of Minerals Separation North American Corporation.

War minerals will be discussed and it is expected that the three-day Standardization Conference will be productive of good results. In all about sixty speakers are scheduled for the various meetings of the convention.

WEEKLY RÉSUMÉ

Five smelters in northern Mexico have suspended operations, and railroads and various mining companies have been crippled by the act of coal operators of Coahuila in shutting down their mines as a result of the deadlock in the labor situation. It is reported that officials of the de la Huerta government have taken over some of the coal properties in consequence. At Pachuca 3,000 men were laid off the last week in October. In this country the financing of the zinc ore storage warehouse project in the Joplin-Miami district is reported to have been arranged. In Arizona, Iron Cap has brought suit against the Arizona Commercial at Globe, in an effort to have the pending litigation between the two companies heard in the district where the properties are located. At Jerome the United Verde has cut its force owing to the condition of the copper market. The Denn-Arizona, at Bisbee, has shut down. In Colorado the Gem Mining Co. has acquired the holdings of the Argo Reduction & Ore Purchasing Co., including the Newhouse tunnel. In Canada the case of Stewart vs. Molybdenum Mining & Reduction Co. has been decided in favor of the defendant, whose property is in the Alice Arm district of British Columbia. The suit over the ownership of the Engineer Group at Atlin, B. C., is now being heard; the claims are alleged to have been fraudulently jumped by the late Captain Alexander. In Ontario the power situation is easier.

The scope of the work of the new Mississippi Valley experiment station of the U. S. Bureau of Mines has been decided upon and a program for the future drawn up.

Five Mexican Smelters Closed Owing to Coal Strike in Coahuila

Coal Operators Shut Down—Mines Flooded—Many Miners Leaving for U. S.—Railroads Crippled

The most discouraging condition in the mining situation throughout Mexico at the beginning of November is the collapse of all efforts of the government to harmonize the differences between the mine owners and strikers of the coal fields in Coahuila. After the appointment of various special representatives by the President, whose efforts have all failed, the companies decided to close, some of them announcing a suspension of six months. All the mines are now flooded and even if an agreement were reached it would require several weeks at best to reopen effectively. In the meantime the mine workers are emigrating in large numbers, many hundreds having crossed into the United States in search of work.

The first result of the closing was the shutting down of the smelters at Aguascalientes, Torreon, San Luis Potosí, Saltillo and Monterrey, throwing over 30,000 men out of employment, in addition to the 8,000 mine workers. The closing of the smelters will naturally be followed by the closing of a number of mining properties in the north. Another feature is the crippling of the railways, as all the lines in the north use coal from these mines. The first step by the government to secure relief was an order removing, temporarily, the duty on coal and coke, but even with this exemption it is impossible to secure equipment for bringing these commodities into the country in sufficient quantities to better the situation.

The mine operators blame minor government officials for the situation. It is claimed that even agents of the government sent to arbitrate the strike incited the men to hold out and by their attitude made it impossible for the contending parties to get together.

Tax Delinquent Mexican Mines Listed for Re-denouncement

The mining department of the Ministry of Commerce and Industry of Mexico is preparing a formidable list of mining properties which the government has declared forfeited because of the failure of owners to avail them-

selves of the special exemption decree which ended Oct. 31. The list is being sent to the various mining agents throughout the country advising them that the properties in question are open to re-denouncement.

Suit Over Engineer Group at Atlin, B. C., Before Court

The suits predicted with reference to the Engineer mine, at Atlin, B. C., are before the courts. W. L. Goodwin and eleven other prospectors have taken out a *lis pendens* to prevent the sale of the property until their claims can be brought before a grand jury, it being suggested that a sale for $3,000,000 to Cobalt interests is in negotiation.

Mr. Goodwin and his associates assert in effect that they and not the estate of the late Captain Alexander are the lawful owners of the mine. Twenty years ago, it is declared, they staked the claims now known as the Engineer Group and Captain Alexander, it is alleged, staked over them, altering the lines and making the eleven claims which afterward were known as the Engineer claims. It is, therefore, set up that their property was fraudulently jumped and recorded and that Crown grants were wrongfully issued to the Alexander party.

The second action against the estate of Captain Alexander is brought by W. Pollard Grant, of Vancouver, who claims a one-fifth interest in the mine and affirms that documents in his possession will prove that Captain Alexander was his trustee for the one-fifth interest in the mine referred to. Mr. Grant states that one of the business matters bringing Captain Alexander south when he met death through the foundering of the "S. S. Princess Sophia" was to arrange for the transfer to him of this interest.

Iron Cap Brings Suit in Globe Court Against Arizona Commercial

The Iron Cap Copper Co. has instituted action in the Superior Court at Globe, Ariz., against the Arizona Commercial Mining Co., seeking to quiet title to the property in the Globe district claimed by the complainant. This suit counters against apex claims made by the Commercial to the effect that substantially all the ores mined by the Iron Cap came from veins that have surface showings on Commercial ground. The litigation started in an equity suit brought by the Arizona Commercial in a Massachusetts court in February, 1919. This was followed in September of the same year by an ordinary suit in the Massachusetts courts, alleging substantially the same causes of action. Both suits were dismissed for lack of Massachusetts jurisdiction. Thereafter the Commercial filed its suit in Maine. The Iron Cap suit seeks to bring the trial of the dispute to Arizona in the same district in which the mines are located.

Oklahoma Ore Storage Project Financed

Warehouse at Tar River Ready To Open, Others To Follow—Producers Said To Be Well Disposed

There is a revival of interest in the Joplin district in the proposal to store zinc ore as a result of the formal announcement of officials of the Oklahoma Ore Storage Association that a well-known Pennsylvania and New York warehouse company, after sending two representatives to this field and making a careful study of the situation, has agreed to advance money on warehouse certificates to the extent of $9,000,000 in cash at present and with an ultimate limit of $30,000,000.

Several ore bin warehouses were erected in this district in the last year but no attempt has been made to use any of them. When one of them was partially wrecked by a cyclone last spring it was immediately rebuilt. One of the warehouses, that located at Tar River, Okla., will open at once and the other four at intervals of a week or two weeks until all are in operation, provided the ore producers are willing to try out the plan.

The larger operators of the field are said to be quite ready to have the plan given a thorough trial. Some of them express the opinion, however, that the proposed scheme is quite likely to be tried by the smaller companies only and so result in keeping some of them producing ore when they ought to be closed down.

Utah Con. Turns Disputed Ground Over to Utah Apex

The Utah Consolidated Mining Co., of Bingham Canyon, Utah, which recently lost the decision in its celebrated apex suit against the Utah Apex Mining Co., has stopped mining ore in the Highland Boy limestone under Utah Apex territory since Oct. 20, when the court's decision was handed down. The workings in question were immediately turned over to Utah Apex without the necessity of a court injunction. Within thirty days of the entry of the decree the Utah Consolidated must file a statement of the ores extracted from below the surface of the Utah Apex giving the tonnages and value.

Mineral Resources of Ungava, Quebec

The return to civilization of H. L. F. Blake, civil engineer, and his party, which had spent the summer in exploration work in the Ungava region of Quebec, has caused it to be known that a British syndicate will spend a large sum in developing that region. Mr. Blake left last March, and on arrival at St. Felicien, Quebec, collected supplies and a party of Montagnais Indians, with dogs, sleds and canoes. They proceeded north to Chibougamou; en route to Lake Misstassini, thence north to Lake Nichinsen, and then into the unknown. Ungava has been found rich in minerals.

Some Austrian Iron-Working Industries Stagnant

Former Customers in Newly Created States Can in Some Cases No Longer Import

From Our Vienna Correspondent

Vienna, Oct. 12—Many branches of the iron-working industries show no signs, as yet, of interrupted productivity, but complete stagnation has prevailed in some groups for some time past. There are various reasons for this. Thus the armature industry is very dull, because many of the newly erected states are beginning to supply themselves in part, while no deals can be concluded with some other foreign districts, such as Poland. In most of the cases where the machinery trade complains of stagnant conditions, the trouble lies in the high price, which hinders domestic sales and makes foreign traffic quite impossible. This is the trouble with certain types of machine tools.

Some branches of the Austrian iron-working industry, whose products have a world-wide reputation, can no longer deliver their goods abroad because the new national states are already prepared to manufacture the same things. This is the case with railway axles among other things. The Austrian heavy-duty-axle business, which is almost wholly within the confines of Austria, until recently delivered its products to Silesia and Moravia, Hungary, the Balkan countries and to the South. Today some enterprises in Czecho-Slovakia are prepared to manufacture car axles, and the government at Prague now draws from them and refuses import permits for this line. Also in Jugoslavia a firm has taken up the manufacture of freight axles. In Hungary the demand for these articles is now chiefly supplied by the Rima Muranyer Ironworks Co. The prospect is also poor for exports to the Balkans.

The danger to Austrian industries arising from possible development of special industries in the new national states to compete with hitherto Austrian specialties is felt in other lines of the German-Austrian iron and metal wares. Just at present it is specially acute, since the sluggishness in the usual domestic products of the new states is diverting energy to the manufacture of articles not previously produced there.

In yet other branches of the iron industry it is lack of material that is interfering with industry. This is particularly true of the wire-working industries. Because of wire shortage in Austria it is necessary to bring in German material at high prices. Therefore some forms of wire, for example, wire nails, continue very scarce.

Burma Corporation produced 2,790,000 lb. refined lead and approximately 251,550 oz. refined silver in September, compared with 4,424,000 lb. refined lead and 243,340 oz. refined silver in August.

Tonopah Section of A. I. M. E. Holds Third Annual Meeting

John G. Kirchen Elected Chairman—Reno Selected for Next Year's Session—Tonopah Divide Mine Visited

BY E. R. BENNETT

The third annual meeting of the Nevada Section of the American Institute of Mining and Metallurgical Engineers was held at Tonopah, Nev., on Oct. 26-27, 1920. Owing to war conditions in 1918 and labor troubles in 1919 no meeting has been held since the session at Ely, Nev., in June, 1917.

Thirty-four members registered at the opening meeting at the Elks' hall at 9:30 a.m. on Oct. 26. The meeting was called to order by Prof. J. C. Jones, vice chairman of the Nevada Section. In his opening remarks Professor Jones spoke of the advisability of holding meetings at least once a year in order to facilitate an exchange of ideas on practice and methods. After reading the minutes of all previous meetings Henry M. Rives, secretary of the local section, stated that President Herbert Hoover and Secretary Bradley Stoughton had wired their regrets.

The selection of officers made by the nominating committee was unanimously approved and the following were elected: John G. Kirchen, Tonopah, chairman; Prof. J. C. Jones, Reno, vice chairman; Henry M. Rives, Reno, secretary-treasurer. Executive committee: John G. Kirchen, Tonopah; Prof. J. C. Jones, Reno; Governor Emmet D. Boyle, Carson City; R. A. Hardy, Virginia City; W. S. Larsh, Ruth; F. D. Bradley, Goldfield; J. L. Dynan, Tonopah; W. H. Blackburn, Tonopah, and Alexander Wise, Virginia City.

It was the sense of the meeting that the next annual session be held at Reno, Nev., from which place side trips will be taken to Virginia City and Dayton.

At the conclusion of the business session the following papers were presented: "Operating Conditions at Tonopah Extension Mine," by John L. Dynan; "Surface Plant at Victor Shaft, Tonopah Extension Mine," by J. P. Hart; "Mine Pumping in Tonopah District," by Homer L. Williams; "Crushing and Agitating Practice at Tonopah Extension Mill," by H. A. Burk; "Precipitation and Refining Gold-Silver Precipitates at West End Mill," by Fred Ninnis and Walter Anderson; "Tonopah Extension Assay Office," by George L. Christian, and "Mine Accounting," by F. D. Bradley.

An interesting statement in connection with Mr. Dynan's paper was to the effect that the Tonopah Extension Mining Co. during its operating period had marketed 15,267,216 oz. of silver, which returned $10,057,426.50, for an average value of 65.87c. per oz.

The new surface plant at the Victor shaft was described in detail by Mr. Hart, who in his paper explained the difficulties encountered in constructing the plant during war times. In his paper Mr. Williams drew a comparison between pumping practice with turbine and plunger pumps.

After a discussion of the different agitators in use in the several Tonopah mills, Mr. Burk stated that in his opinion the ideal agitator should be of a mechanical type wherein atmospheric air, rather than compressed air, could be introduced by a blowing device. In his opinion impurities, such as engine-oil and CO, in the compressed air, have a deleterious effect that could be eliminated by the use of atmospheric air.

Mr. Anderson, in presenting his paper written jointly with Fred Ninnis, described the general practice of precipitation and refining in the Tonopah district. Some very interesting comparisons have been made in this paper.

Mr. Christian's paper described a well-designed assay office. Numerous labor-saving devices were described in detail. Several different systems of mine accounting were discussed by F. D. Bradley, whose paper proved him to be a close student of the subject.

After the presentation of the papers a recess was taken and the members and guests adjourned to the Mizpah Hotel for lunch. At 2 p.m. the members were taken to the Belmont mill in automobiles, where the party was taken on a tour of inspection by Albert Silver, superintendent of mills for the Tonopah Belmont Development Co.

On the morning of Oct. 27 the members were taken through the Victor mine of the Tonopah Extension Mining Co. The new surface plant at this property also proved of great interest.

Following a luncheon at the Mizpah Hotel an automobile trip was taken to the Tonopah Divide mine at Divide, where an inspection of the underground workings was made. The type of ore deposit at this property was of particular interest to the visiting members. Specimens of the mineral powellite found in the mine were eagerly searched for. The meeting concluded with a dinner at the Mizpah Hotel followed by an informal dance.

Photo by Brissell, Tonopah, Nev.

MEMBERS OF THE NEVADA SECTION, A. I. M. E., AT VICTOR SHAFT OF TONOPAH EXTENSION MINING CO., TONOPAH, NEV.

Canadian Engineers Meet at Winnipeg

Mineral Resources of Manitoba and Alberta Described in Numerous Papers—Possible Government Royalty on Copper Discussed—Dominion's Attitude as to Provincial Natural Resources Denounced

SPECIAL CORRESPONDENCE

THE growing importance of the mining industries of Manitoba and Alberta was reflected in the highly interesting and successful gathering held at the Fort Garry Hotel, Winnipeg, on Oct. 25-27, on the occasion of the second annual western convention of the Canadian Institute of Mining and Metallurgy. There was a large attendance, including a number of members from eastern Canada. Thomas H. Johnson, attorney general of Manitoba, extended a cordial welcome to the delegates on behalf of the province. President O. E. S. Whiteside in the course of his address said that it was only within the last few years that Manitoba had been regarded as anything but a wheat-growing area. But it had been proved to contain mineral deposits of great value and had the beginnings of what it was hoped would become a flourishing mining industry. He enlarged upon the function of the Institute in educating the public in respect to mining in order that the industry should as far as possible be retained in the hands of Canadians.

The principal feature of the opening session was an address by F. W. Gray, of Toronto, on the coal fields of the West. The gap of 2,000 miles between the eastern coal fields and those of the western provinces could be bridged by an extension of the Great Lakes Waterways to enable Nova Scotia coal to enter Lake Ontario by water carriage, and by the railways adopting a comprehensive program for the transport of coal from the western coal fields. The objective of the Canadian coal mines was to limit the importation of American coal to the smallest area possible. The coal resources of Nova Scotia were not large, while those of the western coal fields were as large as it was desired to make them. The world need for coal was so pressing that it might be that an export trade in coal would precede the development of the western coal field to provide fuel for local industries. He considered that the position of the Alberta collieries with reference to Vancouver, and those of British Columbia with reference to Prince Rupert, were not dissimilar to the relation of West Virginia collieries to the Atlantic ports. The opportunity to enter British markets was open to any coal field in North America that could get its coal to tidewater within commercial limits of cost of rail haul. The real role of the western field, however, would be filled when it had become the site of industries based upon bituminous coal.

Duncan McDonald, inspector of mines of Calgary, Alta., read a paper on mine rescue and first aid work. He stated that voluntary mine rescue training in Alberta had met with very satisfactory results, and was of opinion that this system was much preferable to compulsory training. He pointed out the importance of a knowledge of first aid, lives having been frequently lost where injured persons had been discovered by those ignorant of it.

H. A. Mackay, chief engineer of the Manitoba Bridge and Iron Works, gave an address on the use of powdered coal in the company's rolling mills at Selkirk. Pulverized coal was used in the furnaces for heating billets and scrap for rolling, and also for operating open-hearth furnaces for making standard grades of mild steel from scrap. With the installation of powdered coal a Canadian coal was substituted for the American coal previously used.

A smoker was held in the evening at which moving pictures were shown illustrating the development of water power and other natural resources.

MINERAL RESOURCES OF MANITOBA AND ALBERTA DISCUSSED

On the second day Dr. J. A. Allan, of Alberta University, spoke on the mineral resources of Alberta, emphasizing the need of more accurate information with regard to them, especially now that the province seemed to be on the verge of a great oil boom. In several cases mineral development had been retarded by overestimated reports of the value of deposits. He described the grades of coal in the different basins and pointed out that there was no anthracite in Alberta with the exception of occasional irregular pockets. Among other mineral resources dealt with was the sodium sulphate which occurred as a remarkable deposit on the western margin of Saskatchewan, which was greatly in demand in the pulp industry. In the absence of N. C. Pitcher, professor of mining engineering in Alberta University, a paper prepared by him on the more efficient utilization of Alberta coal was read by Dr. Allan.

J. A. Richard, acting chief inspector of mines of Alberta, briefly outlined the methods of collecting coal samples for analysis and the endeavors made to standardize the analysis.

D. King, of Winnipeg, dealt with the problems in connection with the marketing of western coal, stating that the main difficulty was the prejudice against it. He contended that there were steam coals in the west equal to any coming from the Eastern states and that with different methods of firing some of the western coals would give equal satisfaction.

In the afternoon Prof. F. J. Alcock, of Ottawa, described the various properties in the Herb Lake gold district of Manitoba, stating that a number of them offered good possibilities of being worked at a profit. The present high cost of labor and transportation had been a drawback to development. The amalgamation of several of the more important properties lying close to each other on the east shore of Herb Lake was suggested as a means of reducing the cost of separate management and operation.

J. F. Gordon, the discoverer of high-grade gold deposits in the Copper Lake district of Manitoba, described the geological formation of the area and the development work done on his properties.

ENGINEERS SEE NEED OF RAILWAY FOR FLIN FLON

Dr. R. C. Wallace, commissioner for Northern Manitoba, dealt with the Flin Flon ore deposit and stated that the recent visit of a number of members of the Manitoba Legislature had made them acquainted with the situation and caused them to realize that the property could not be properly developed without a railway. If the deal for the property was completed before the opening of the Legislature the question of a railway would be considered, with a view of leasing it, when built, to the Canadian National Railway Board.

Prof. J. S. De Lury, of Manitoba University, contributed a paper on the Rice Lake district, stating that wonderfully rich pockets of free gold had been discovered. While rich samples were encouraging they must be supplemented by careful sampling of the whole mineral deposit before mining operations were warranted. Such sampling was the most pressing need of the district.

In the evening Dr. R. C. Wallace gave an illustrated lecture on northern Manitoba, laying much stress on the importance of completing the Hudson Bay Ry. as soon as possible to hasten the development of the territory. He regarded the mining industry as the main factor in the opening up of the country. A railway to the Flin Flon property would develop a copper industry and with this would be created a gold mining industry throughout The Pas mineral belt.

POSSIBLE GOVERNMENT ROYALTY ON COPPER DISCUSSED

The following session was largely devoted to a discussion regarding the royalty on copper which the Canadian government may see fit to impose after Jan. 1, 1921. Several speakers expressed strong opposition to the imposition of any royalty on copper for some time to come. A resolution was

adopted which, after reciting that the matter of royalties is left to the discretion of the minister; that valuable orebodies have been discovered which can only be developed by the expenditure of large sums of capital, and that it is important that investors should know with reasonable certainty the government's attitude with respect to royalties, concludes as follows:

"That this convention strongly urge the government of Canada to so amend the said regulations as to set out specifically what are to be the royalties charged on the different minerals produced, and particularly that the time for which copper shall be exempt from such royalty shall be extended for a period of ten years."

Dr. Fahrenwald Talks on Non-Corrosive Steels

Dr. E. A. Fahrenwald, of Cleveland, Ohio, the inventor of non-corrosive steel and rhotarium, gave an instructive address on "Non-Corrosive Steels." The day of the old-time pioneers, he said, had passed and new pioneers of a different type were required—men equipped with modern scientific tools and training. Dealing with industrial and scientific research in relation to future development he stated that knowledge regarding chemical combinations was limited. As soon as a new element is discovered some new industrial application will be found for it. Scientists, by taking advantage of newly discovered relationships of elements, can provide alloys meeting special requirements. Explaining the advantages of non-corrosive steel he cited the non-corrosive gun barrels which would before long come into general use.

H. E. Knobel outlined the possibilities of creating a western iron and steel industry based on purely domestic sources of iron and coal. He claimed that Ontario iron ores and Alberta coal could be utilized for steel to supply western Ontario and the prairie provinces.

Data Presented on Operation of Mandy Mine

G. R. Bancroft, superintendent of the Mandy mine of northern Manitoba, presented some interesting details in regard to the discovery and operation of that deposit. The gross value of the production from the Mandy up to the present was $2,000,000, and a large tonnage of ore remained untouched which was of too low a grade to stand the transportation charges, but could be handled to good advantage by a smelter at Flin Flon.

D. C. McArthur, of Winnipeg, gave an address on the non-metallic deposits of Manitoba.

In the afternoon a visit was paid to the rolling mills of the Manitoba Bridge & Iron Works and the plant of the Manitoba Steel Foundries at Selkirk.

The convention was brought to a close by a banquet in the evening, the principal speaker at which was Hon. E. Brown, provincial treasurer of Manitoba, who said that the position taken by the Dominion government with regard to provincial ownership of the natural resources was an outrage and an injustice and in every way indefensible. The Dominion government had expressed a willingness to turn over the natural resources to the province, subject to the approval of the other provinces. They had met in conference with the other provinces but without result, and it was unfair that the provinces which controlled their own resources should have anything to say against the western provinces getting control. They had hopes, however, that a settlement would be reached and some redress obtained but until that time came it would be folly for him to seek to outline a mining policy. Speaking of the Flin Flon property, Mr. Brown said that the construction of a railway was properly a matter for the Canadian National Ry., but it had turned it down. The province would probably build the road, but officials were waiting for a guarantee from the holders of the options that the products of the mine would be sufficient to justify the outlay of $8,000,000 which would be required to build the railway.

More British Capital Needed, Says Winnipeg Mayor

Mayor C. E. Gray, of Winnipeg, said that while he was glad to see American capital come in, he would like to see the introduction of more British capital. He advocated the appointment of a commission of industry to give correct information concerning the natural resources of the province to the British public. The opening up of the north country was largely in the hands of the mining engineers, who could do much to give capital faith in its development.

J. A. Campbell, M. P., thought that the transfer of the natural resources from the Dominion to the control of the provinces was the most important question at the present time. The western provinces should get together and demand a settlement, he said.

T. R. Deacon spoke of the need of developing natural resources to their fullest extent as a means of rectifying the adverse balance of trade which resulted in the depreciation of Canadian currency.

Blast Furnaces in Switzerland To Smelt Swiss Iron Ore

Special Berlin Correspondence

After systematic prospecting iron ore deposits of importance have been discovered in Switzerland which promise to be an important factor in the economical development of the country. They are located near Herznach in the valley of the River Frick and estimated to contain at least 15,000,000 tons of phosphorus iron ore averaging approximately 31 per cent iron. The mining conditions are favorable. Preparations are being made for the erection of blast furnaces. The Federal government of the republic has submitted to the legislature a bill for financial support by the state of the new enterprise.

Molybdenum Mining & Reduction Wins Against Stewart

Supreme Court of British Columbia Decides in Favor of Alice Arm Company

The question of ownership of the Molybdenum Mining & Reduction Co.'s property in the Alice Arm district of British Columbia has been closed as far as the Supreme Court of the province is concerned. The action is known as Stewart vs. the Molybdenum Mining & Reduction Co., Ltd. Chief Justice Hunter, who finds for the company, says in his judgment:

"I think that the plaintiff Hayes had no right of action against the company. As to the other plaintiff, I am of the opinion that the Conundrum claim (one of the claims of the group) lapsed on June 13, 1915, and was not revived by the Exemption Act, 1915. The Conundrum ground was relocated and recorded by Riel and his associates, who conveyed it to the company, but the plaintiff rests his action mainly on the agreement of Aug. 19, 1915, by which the co-owners of the Conundrum and Hayes, the owner of the Blackwell, agreed to sell those claims for $35,000 to Riel.

"Moreover it appears to me that the action of Riel in locating and dealing with the new claims was acquiesced in by the plaintiff and this view is strongly corroborated by the giving of the subsequent agreement to Riel pending the litigation.

"At any rate the plaintiff stood by while large sums of money were expended on the ground without notifying either the Stilwells or the company that he had any claim against them or it and the principle applies that if a man is silent when in fairness he ought to speak he must remain silent when in fairness he ought not to speak."

Recent Production Reports

Old Dominion produced 2,912,000 lb. copper in October compared with 1,957,000 in September.

Inspiration produced 7,000,000 lb. copper in October compared with 6,500,000 in September.

Anaconda produced 11,000,000 lb. copper in October compared with 11,100,000 in September.

Greene Cananea produced 3,500,000 lb. copper in October, the same as in September. The October production of silver was 156,200 oz. and of gold 895 oz.

Kennecott produced 8,878,000 lb. copper in September (including Braden's output) against 11,268,000 in August.

Interstate-Callahan's shipments in October increased about 20 per cent over those in September. Comparative figures are: Zinc concentrates, 5,000,000 lb., as against 4,230,000 in September; lead concentrates, 2,600,000 lb., compared with 2,180,000 lb. in September; and silver, 26,000 oz., which compares with 21,800 oz. in September.

U. V. Extension produced 3,864,756 lb. copper in October, compared with 3,327,644 in September.

NEWS FROM WASHINGTON

By PAUL WOOTON
Special Correspondent

Scope of Mississippi Valley Station's Work Agreed Upon

Improvement in Zinc Smelting One Important Objective—To Maintain Office in St. Louis

As a result of the conference last month in St. Louis with the zinc and lead operators, the following program has been agreed upon for the Mississippi Valley experiment station of the U. S. Bureau of Mines:

Mining problems: (1) Underground handling and haulage of dirt, (2) drill steel problem in co-operation with the North Central Station of the Bureau at Minneapolis, Minn.

Ore-dressing problems: (1) Careful study of the milling problems met with in each of certain districts; namely, Wisconsin, Illinois, southeast Missouri, and Joplin.

Metallurgy: That an intensive study be made as far as the funds of the station will permit of processes other than retort processes applicable to the treatment of zinc ores found in the Mississippi Valley and which will enable the metal to be obtained from the ore at a lower cost than do present-day processes.

In addition to the personnel already announced, Prof. C. R. Forbes, professor of mining in the Missouri School of Mines and Metallurgy, has been appointed consulting mining engineer, and has been asked to direct that part of the drill steel investigation which has to do with the actual use of drill bits, their proper sizes, shape, etc.; this work to be carried on in co-operation with the North Central Station of the bureau at Minneapolis, Minn.

Through the courtesy of the Chamber of Commerce of St. Louis, the bureau has been given office quarters in room 713, Chamber of Commerce Building, corner of Broadway and Locust Street. This office will not only serve as headquarters for the Mississippi Valley Station, but for the bureau's activities in that part of the country as well, and will also serve as the St. Louis office for the Missouri School of Mines and Metallurgy, and for the Missouri State Geological Survey.

In this connection, Dorsey A. Lyon, supervisor of stations, said: "The object of establishing this office in St. Louis is to permit the bureau to maintain more readily a contact with the industry. It is hoped that the industry will feel free to visit this office and become acquainted with F. F. Rutledge, the superintendent, and his assistants. The Mississippi Valley mining experiment station has been established for the benefit of the lead-zinc industry of that region. However, it will fail utterly in its purpose unless it has the hearty support and co-operation of those interested in the lead-zinc industry. It is, therefore, earnestly hoped that the industry will take an active interest in the work of the station and will not hesitate to offer any suggestions in regard to the work of the station that will enable it to best serve the industry."

It is regarded as probable that the state of Missouri will follow the example of Alabama and add to the appropriation of the station an amount equal to that appropriated by the Federal Government. If, in addition to that, co-operative agreements may be effected with some of the operators some very comprehensive work on zinc and lead can be undertaken.

It has already become evident that there is an unusually favorable opportunity existing for technical study of the mechanical means for handling dirt in the mines of the Mississippi Valley. Another important phase of the station's work is a study of the metallurgical problems. This is pointed out by Prof. Charles H. Fulton, the director of the Missouri School of Mines and Metallurgy. He says:

"Looking on the metallurgy of zinc from a broad viewpoint, the fact stands out that present practices and principles are ancient. Present-day practice is essentially what it was 150 years ago. In modern times this ancient practice is met with certain great disadvantages. It requires a large amount of hand labor and consumes an enormous amount of fuel for the results obtained. It differs in principle from the metallurgy of other metals, in which labor-saving devices have been long employed and in which large units are used in the production of metal. Even the largest zinc furnace is small because it is within the retort. Since fire clay is the refractory material used increase in the size of the retort is limited. I am a firm believer that the electric furnace is the solution of the problem."

New Import Classification Needed

It is very generally recognized that there is the greatest need for a revised classification covering imports and exports of commodities. The Bureau of Foreign and Domestic Commerce, which compiles import and export statistics, is being relied upon more and more by the industries for this information which is so necessary to the intelligent conduct of nearly every enterprise. There also is the greatest need, in the opinion of students of the question, for placing under a single management the Bureau of Customs Statistics in New York and the Bureau of Foreign and Domestic Commerce in Washington. Whether this reform can be put into effect January 1 depends entirely upon securing the necessary appropriation before that date. Otherwise it must go over for a full year.

War Mineral Awards

A total of $75,039.06 was recommended for award by the War Minerals Relief Commission for the week ended Oct. 30. The recommendations, showing the name of the claimant, the mineral, the amount recommended and its percentage relationship to the amount claimed, are as follows: Liberty Manganese Co., manganese, $4,851.75, 30 per cent; Baker Hot Springs Manganese Co., manganese, $789.26, 30 per cent; J. J. Appel, manganese, $2,375.41, 36 per cent; Georgia Iron & Coal Co., manganese, $55,404.01, 32 per cent; Layton and McCormick, manganese, $1,459, 58 per cent; Needles Mining Co., manganese, $4,561.66, 25 per cent; P. S. Dean, chrome, $1,856.50, 33 per cent; J. K. McCloy, chrome, $300, 75 per cent. Further awards have been recommended in the following claims which had been acted upon previously by the committee: Charles L. Cole, $1,669.49; J. E. Higgins, $814.40; Adama & Woodward, $957.50.

Survey and Bureau of Mines Men on Standards Committee

Responding to an invitation of the American Engineering Standards Committee, the Department of the Interior has appointed three members to serve with that committee. They are P. S. Smith, of the U. S. Geological Survey; E. A. Holbrook, of the U. S. Bureau of Mines, and O. P. Hood, of the Bureau of Mines. Messrs. Holbrook and Hood also become members of the subcommittee on mining equipment.

Mine Experiment Station Heads To Meet in San Francisco

Dorsey A. Lyon, supervisor of experiment stations for the U. S. Bureau of Mines, has called a meeting of all superintendents of stations west of the Mississippi River to be held in San Francisco January 17, 1921. The principal object of the meeting is to coordinate plans for future investigations.

A total of 148,338 tons of nitrate of soda moved through the Panama Canal during August. All but 46,569 tons, which went to European ports, was destined to American Atlantic and Gulf ports. Two cargoes of chrome ore destined to New York also passed through in August.

NEWS BY MINING DISTRICTS

Special London Letter

Recent Developments on the Rand—West African Diamonds Reported in Blue Ground at 12 Ft.—Dolcoath Tin Mine To Shut Down

BY W. A. DOMAN

London, Oct. 26—Internationally, the gold supply is of so important a character that the latest developments reported from Johannesburg are creating a very considerable degree of interest. It is generally believed that as a whole, and certainly where the central part of the field is concerned, the Witwatersrand has seen its best days. So far as regards production of the metal the mines of the Far Eastern section are affording, and seem likely to afford still further, ample compensation for the shortcomings of the older areas. What were originally the finest properties have become virtually exhausted, so that now eyes are turned to the great Modder trio, namely, New Modderfontein, Modderfontein B, and Modderfontein Deep, and to Geduld, Springs, Van Ryn Deep, Brakpan, and others. There is considerable activity all over this district, and the finance houses are using their utmost endeavors to maintain the supply of gold. Several new shafts are being sunk, and development is being pushed forward as rapidly as the supply of native labor will permit. There are two outstanding events of the current week. The New State Areas, a mine under the management of the house of Barnato, has encountered the reef in the south shaft at a depth of 3,676 ft., and the Geduld Proprietary has announced some capital values disclosed in development work during the September quarter. The significance of these two items of news lies in the fact that the properties are contiguous, the southern boundary of Geduld forming the northern boundary of the New State Areas. In the shaft of the latter mine twelve sections taken over the whole bottom give an average assay value of 89.8 dwt. over 18.9 in., the dip of the reef being 8 deg. This is almost flat, and consequently does not make for a great tonnage per claim, through the reef in this part of the Rand is very undulating, so that no real conclusions can be drawn. The result is nevertheless highly encouraging. It is not often that a shaft sunk, so to say, in the veldt, strikes a rich patch as in the case of New State Areas, though it has happened previously on the Rand. The orebodies in the Far Eastern section run in shoots, and the Geduld Proprietary in its east drive at No. 7 level of No. 3 inclined shaft has driven 3,219 ft., of which 2,820 ft. have been sampled. Of this 64 per cent is payable, and assays 17.6 dwt. over a stoping width of 66 in. It must be admitted that such a length and value are good, and create hopeful views as to the gold content of the reef in the ground as yet unproved between the workings of the two companies. Another interesting point is the cutting of the reef in the Daggafontein ground, in the same vicinity, at a depth of 3,951 ft., assaying 26.1 dwt. over 14.5 in.

An interesting rumor is current that a private undertaking called the West African Diamonds has struck blue ground at a depth of 12 ft. Usually yellow ground is first encountered in a diamond pipe, but possibly there may be no yellow at all. The work on the property is in charge of a diamond prospector from the neighborhood of Kimberley, a fact which makes people place more reliance in the report than they would otherwise do. Alluvial diamonds, up to ½ carat per load, are said to have been found in the vicinity. This, if true, is distinctly high, for De Beers and even the prolific Premier yield nothing approaching this figure.

The Nundydroog, a leading Indian mine on the Kolar field, finds itself in want of funds. It has reached a depth of 4,000 ft., and the management, John Taylor & Sons, wish to sink 2,000 ft. lower, because at that depth the Ooregum mine to the south is meeting with high-grade ore. A reconstruction is proposed, one new 10s. share carrying the heavy liability of 6s. per share being exchanged for each existing 10s. share.

The directors of the famous old Dolcoath tin mine in Cornwall have given notice to the employees to stop work, owing, it is believed, to the financial uncertainty caused by the coal strike. The china clay industry is also seriously affected on account of the shortage of bunker coal affecting shipping.

CANADA

British Columbia

Diamond Drilling Discontinued on Gloucester Group at Franklin

Grand Forks—Diamond drilling on the Gloucester Group and the G. H. claim of Franklin camp, near Grand Forks, which has been in progress for some months under the supervision of the provincial department of mines, has ceased on account of winter weather. A total of 2,888 ft. of drilling has been done in the camp, most of it on the two properties named.

Trout Lake—The Mansfield Mining Co. has uncovered a large vein of $12 silver-lead ore at a depth of 350 ft., according to M. R. Leahy, manager.

Ontario

Few Tax Delinquent Claims Restaked—Power Conditions Improved

Cobalt—In the Cobalt and Lorraine sections twenty-five claims that were thrown open last week because of the defaulting on taxes have been restaked. In the Larder Lake district less than fifteen claims have been restaked. As far as can be learned about 14,000 acres have been thrown open, but apparently, with the exception of a few of the more promising properties, no great activity was shown in restaking which is not considered surprising.

Power conditions in Cobalt and Porcupine have decidedly improved during the last week, owing to the open weather and the considerable amount of rain and snow which has fallen. In Porcupine conditions, although bad, are better than in Cobalt. The power company has only started to draw on its storage within the last two weeks, and without any additional precipitation has sufficient water to carry the mines through at full capacity for about sixty days. The officials of the company endeavored to have the Porcupine operators co-operate and cut the amount of power consumed. It was difficult, however, to get the operators together, so the power company has decided to keep running at full capacity and take a chance on the rainfall later.

In Cobalt also rain has fallen, and in addition to this the mines have been co-operating and have decreased their power consumption about 20 per cent. The same conditions apply in Kirkland Lake.

There is still little evidence of the freeze-up, and operators are hoping that they will get enough water to carry them through the winter. Practically none of the Cobalt mines have had air compressors in operation for several years and have depended entirely on the air supplied through the power companies. Although some of these compressors could be put in commission at short notice, it is probable that the coal supply is not sufficient to enable them to operate for more than two months.

The Crown Reserve is dewatering the North Cobalt mine in Bucke Township, and also has claims under option in Gillies Limit, South Lorraine, Larder Lake and Northwestern Quebec, which properties the company intends to prospect.

Kerr Lake has installed a crusher and is ready to start shipping its 75,000-ton dump to the Dominion Reduction Co. The three veins discovered on the surface while installing the crusher will be developed from the 90 and 150-ft. levels.

H. H. Sutherland, of Toronto, has left for England to conclude the deal for the disposal of Davidson stock to English interests. About $1,000,000 is involved.

It is understood that the Murray-Mogridge gold mine will endeavor to arrange in England the financing of further operations.

MEXICO

Claimed Taxes Must Be Reduced If Silver Output Is To Be Maintained

City of Mexico—The mining department of the Ministry of Commerce and Industry of Mexico has issued a statement to the effect that the decline in the price of silver has not, as yet, affected the production of that metal in Mexico. During the first six months of 1919 the output for the entire republic was 30,538,000 oz., compared with which the production for the first six months of 1920 was 32,958,000, an increase of 2,420,000. The statement adds that thus far the production for the last six months of the year is considerably in excess of the output for a similar period last year.

The president of the Industrial Chambers of Industry takes issue with the statement of the Minister, although no attempt is made to refute the actual figures given. The former points out, however, that by far the larger portion of the silver producing properties of Mexico carry low-grade ore which was worked extensively during the first part of the year but cannot continue to be worked profitably under present prices unless the government comes to the relief of the silver miners by a reduction in general taxes and also a considerable reduction in the export tax. The facts are that up to this date none of the silver camps have actually suspended work. The larger concerns are holding their bullion confident of a reaction.

It is reported from Mexico City that coal mines in the northern states were taken over by officials of the de la Huerta government on Nov. 5. Government ownership is not intended.

State of Mexico

San Miguel Tlaxpampa Puts Mill in Operation

Zacualpam—The San Miguel Tlaxpama, district of Zacualpam, started milling late in October on good grade ore and the management is pushing the output despite the unpromising price of silver. The San Miguel is an old property, recently reopened and reorganized with strong backing. S. J. Lewis is in charge.

A number of small properties in the same district are preparing to open up. The principal drawback to the development of the district is the lack of railway transportation.

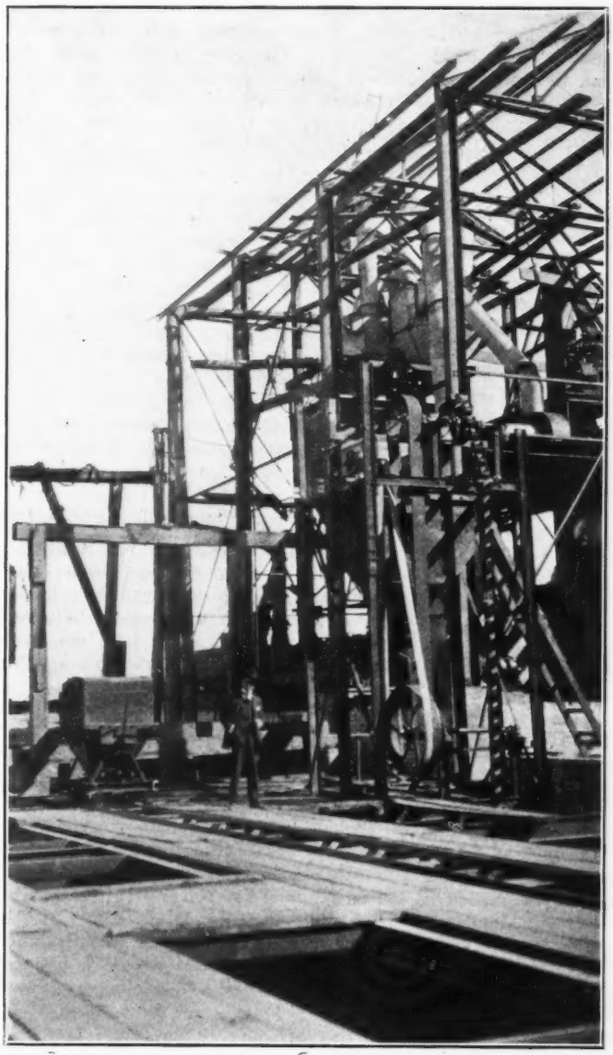
Guanajuato

Guanajuato—J. Walker, formerly manager of the Bank of London and Mexico, now heavily interested in mining here, held a very satisfactory conference with the President of the Republic relative to the removal of the heavy export taxes on the output of low-grade properties. A very large portion of the mines in this state come under this head. Mr. Walker reports that assistance was promised along the line outlined and that an effort will be made to secure rolling stock to remove the congestion here.

Hidalgo

3,000 Workers Laid Off at Pachuca

Pachuca—Three thousand men were laid off the last week in October, ostensibly because of the low price of silver. All the large properties here are working on low-grade ores. Probably the real reason for letting the men out was to forestall a strike which had been threatened on a large scale that would have resulted in a complete paralysis of the entire camp.



EQUIPMENT FOR DRYING AND PULVERIZING CHARCOAL USED FOR FIRING REVERBERATORY FURNACE OF FAMATINA MINING CO., SANTA FLORENTINA, ARGENTINA

ARGENTINE REPUBLIC

Operations of Famatina Mining Co. in Chilecito Region

Santa Florentina—The Famatina Mining Co. in the Argentine Republic, is operating at Santa Florentina in La Rioja province, Department of Chilecito. Santa Florentina owes its existence to the mining activity of this region. The town is situated at the foot of Famatina Mountain, at the top of which, about 15,000 ft. above the sea, are located the rich copper deposits which have been known for years.

The mines can be worked only during the summer months. For transporting the ore the national government has built an aerial tramway, 21 miles long, with eight stations from the mines to the smelter, which may be used by private individuals on payment of a very small freight charge per ton.

For many years the ore was treated in small smelters equipped with water jacketed furnaces which used almost all the available wood of the near-by forests. These although not very large, gave life at least to those regions that today are completely arid and desolate.

Owing to the high-grade ore, the Famatina company was formed and installed a smelter with reverberatory furnaces having a capacity of 200 tons per day. The smelter has been working since Aug. 18 of this year. There are also two converters each with a daily capacity of 10 tons of blister copper carrying a little gold and silver, also equipment for drying and pulverizing charcoal which was bought in Detroit, Mich., and all the accessories required in a plant of this kind. A low-grade gold quartz will be used for lining the converters.

In addition to what has been mentioned the equipment includes two turbines, boilers and two water jacketed furnaces with a capacity of 100 tons.

In spite of the fact that charcoal does not give a high efficiency in the reverberatory furnaces owing to the fact that it has a low percentage of volatile matter, nevertheless the company hopes to get good results and has undertaken to build a similar smelter. The heat of combustion passes under a series of waste heat boilers which generate steam for operating air compressors that supply air to drills in the mine.

The ore averages 5.5 to 6 per cent copper, 28 to 30 grams of gold per ton and from 300 grams to 1 kilogram of silver per ton. The mineral is found in the form of oxide, sulphide and carbonate.

The Chilecito region has an abundance of minerals and there are silver mines which yield 70 kg. per ton. There are also gold and lead mines. Leo W. Michel, an engineer, is trying to organize a company with Chilean capital to exploit a wolfram mine which according to all reports can supply a fair tonnage of wolfram ore.

Mendoza—The owner of the mines of Paramillo de Uspallata, Benito Villanueva, who is vice president of Argentina, has recently sent Zako S. Béyl, Lester W. Strauss and Dr. E. H. Bergeat into this field for the purpose of making reconnaissance and laying out a working plan. It seems that these engineers are going to re-establish a company with Dutch capital to exploit silver properties of this region where ores are found that contain 1 to 2 per cent silver. This is without doubt one of the most important mines of the Argentine Republic, and is situated close to the city of Mendoza. The orebody is about 4 kilometers in dimensions north and south and 4½ kilometers east and west. Galena is the commonest mineral and is found in all of the veins, at times mixed with considerable blende. Chalcopyrite is found in all of the veins and is generally mixed with iron pyrites, which causes considerable variation in the silver and copper content. Tetrahedrite and antimony and arsenic minerals also usually occur. The Paramillo ore is very complex and refractory to smelting, which is the method commonly used for reduction, and to date has not given very good results.

It is proposed to install a concentrator. There is over $400,000 (U. S.) worth of machinery, tools and buildings at the mine. All the veins have been sufficiently worked to make it possible to estimate the available ore approximately. There is also about 30,000 tons of ore in stock.

In the region south of Mendoza exploration permits have been solicited for 1,000,000 hectares (2½ million acres) with the idea of locating rafaelite, vanadium ore and petroleum. The people making the investigations are Argentinians, Chilians and North Americans.

Sandstones have been found which contain 1 to 2 per cent of molybdenum according to analysis by the Division of Mines of Mendoza Province, and this has no doubt created some excitement.

CALIFORNIA

Control of Plumas-Eureka Said To Have Changed Hands

Quincy—W. J. Gruss, president and operating manager of the Gruss Mining Co., reports that he has struck the east and west vein at the point where it crosses the Gruss vein, about 350 ft. north of the shaft on the 200-ft. level. The vein was entered on the footwall and though it has been crosscut for a distance of 30 ft., the hanging wall has not been reached. Mr. Gruss plans to install a 200-ton mill and to buy power from the Great Western Power Co. whose line passes within 1,600 ft. of the property on its way to the Walker mine. Regular shipments of concentrates to the smelter are planned.

Colfax—Activity at the Rising Sun mine near Colfax is increasing. The mill is running twenty-four hours. The ore coming from the mine is of excellent grade and it is thought that the company will soon enter the ranks of dividend payers. The ore recently cut on the 6th, 7th, 8th, and 9th levels is being developed, and enough ore to keep the mill in operation for some time to come is said to have been blocked out.

Sutter Creek—Operations at the Central Eureka mine are progressing steadily. The ore coming from the newly opened level is improving as the crosscut advances. Most of the new machinery is in place, adding to the efficiency of the plant.

Yreka—The Roxbury Mining Co. has completed preparations for extensive hydraulic operations and will place three giants in commission as soon as water is available. Much profitable gold-bearing gravel is in sight.

It is rumored in mining circles that the Plumas-Eureka gold mine, near Johnsville, has passed into the control of the Guggenheim interests. The property is near the Plumas copper belt, and has been a great gold producer for many years.

NEVADA

Ely District Shipping Manganese Ore

Ely—The Jennie A mine at Hamilton, near Ely, will continue development work during the winter, though the trucks will stop hauling ore to Kimberley. Five cars of silver-lead ore have recently been sent to the Utah smelters. John W. Nice is in charge.

Shipments of manganese ore are being made from the Ely district at present. Increased demand and better prices are reported, but increased freight charges menace the activity.

Pioche—Ore shipments from the Pioche district for the week ended Oct. 28 totaled 2,955 tons. Shippers were: Prince Con., 1,750 tons; Virginia Louise, 650; Con. Nevada Utah, 200; Bristol Silver Mines, 160; Black Metals, Inc., 105; Bristol Battles Lease, 45, and Bristol Campbell Lease, 45.

COLORADO

Gem Mining Co. Acquires Argo's Holdings, Including Newhouse Tunnel

Idaho Springs—The tunnel, mill and mining properties of the Argo Reduction & Ore Purchasing Co. have been acquired by the Gem Mining Co. By this transaction the Gem Mining Co. secures control of the Newhouse tunnel with its numerous tributary properties in Clear Creek and Gilpin counties, including the Gunnell mine, which is tapped by the tunnel at a point over 4½ miles from the portal. Recently the Gem Co. secured the properties of the Idaho Mining, Tunnel & Transportation Co., which, together with the original Gem holdings, will materially increase the company's field of operations. The Gem and Silver Age mines are working a crew of about forty men, and as soon as the results of development warrant the working forces will be increased. The production from these properties is now being treated at the Newton mills, but it is probable that the Argo mill will be placed in operation as the tonnage from the newly acquired properties is increased. The Gem Mining Co. is engaged in custom milling, in addition to treating ores from its own properties.

Telluride—Shipments for September were as follows: Tomboy, 31 cars; Smuggler, 33; Liberty Bell, 4; total, 68, all concentrates. Shipments were curtailed by reduction in output of the Smuggler as a result of fire destroying important milling equipment, and on account of a rock slide which temporarily stopped operation of the Tomboy tramway.

Durango—The Esmeralda property is being developed under the direction of W. B. Cauble. Several pockets of rich silver ore have been opened recently. A small trial shipment to the smelter returned over 300 oz. silver per ton.

Leadville—Development is under way in the Fanny Rawlins property, and the first level is being advanced into oxidized ground. On the 4th level some high-grade ore has been developed and is being shipped to the local smelter. About fifteen men are employed.

Alma—Rich ore has been opened recently in the old Dolly Varden property. Assays as high as 400 oz. per ton are reported. A. E. Moynahan is manager.

Gladstone—The Bandora mine has been reopened, and is being developed and operated under the management of E. D. Lycoff. Shoots of silver-lead ore have been opened. The boarding house is being remodeled and two new bunkhouses built, so that work can continue throughout the winter.

Gilpin County—The Topeka and Frontenac mines, formerly operated by the late Henry P. Lowe, have recently been examined in the interests of a New York syndicate, which is supposed to represent British capital.

Ouray—Lessees and small operators have nearly all suspended, owing to high freight and treatment costs. A few have survived and are putting in supplies for the winter. A storm bringing one to two feet of snow has temporarily stopped hauling to and from the mines, but though this is somewhat unusual, all mines will yet have time to make their usual preparations before winter sets in.

The Paymaster Mines Co. has completed the cleaning out and repairing of the Virginia tunnel and is laying track therein preparatory to continuing the drive to cut the ore body recently encountered on Paymaster ground. This will probably be done by contract.

The Mountain Top, Atlas, and Camp Bird remain the only larger mines in operation, the Red Mountain Mines Co. having suspended operations for an indefinite time, chiefly on account of adverse external conditions. The Moun-

tain Top is connecting an air lift and will shortly begin unwatering the shaft to reach the main high-grade body. Plans for a drainage and haulage adit lower down are being perfected.

Among the smaller operators, the Eurades Mining Co. has completed buildings, coal bins and the like and is beginning to haul supplies for a vigorous development campaign during the winter. James A. Lannon, in charge of the Guadaloupe, is installing machinery and supplies for development through a new and lower adit level. Lessees at the Barstow have opened a large body of good milling ore and are putting in supplies for the winter; the winter's accumulation of ore will be milled next summer, as usual. The Paymaster Mines Co. has begun work in the lower crosscut on the Silver Bell and will soon reach the Silver Bell "break," which will be followed to the Paymaster shaft. The Ouray Consolidated M. & R. Co. has been reorganized under K. MacDermid and is taking options on good property near its mill in Ironton, expecting to begin exploration and development on this property this fall.

The test runs at the Gold Crown mill in Ouray by the Pony Express company are about completed and have demonstrated several things of interest locally. About 100 tons of Beaver Belfast ore, carrying considerable lead and much zinc, was successfully treated; high-grade lead concentrates and zinc concentrate were produced in a small mill using only a ball mill, one flotation machine and a few tables. Pony Express ore is now being treated with good results; this is a semi-oxidized siliceous silver ore, regarded as impossible of treatment by flotation. This is the first attempt in years to do any experimental work on such a scale and demonstrate the possibilities of these ores, which have been untreated for years. The success of these tests is inducing serious consideration of other tests on various ores, likely to result in some of these mines being reopened.

Mayday — The Ten Broeck, seven miles above Mayday, on Lewis Mountain, has opened a new vein in the 3,000-ft. tunnel. It is 4 to 5 ft. wide and assays from $12 to $25 per ton in gold and silver.

Another lime orebody has been opened at the Esmeralda. This is the sixth stratum of lime opened here and makes a total of 9 ft. of ore assaying 22 oz. per ton in silver. A shipment made to the Durango smelter brought returns of 320 oz. per ton in silver. A 25-ton mill is to be erected.

Lessees have taken over the Mayday, one of the largest producers of high-grade ore in the district, and will begin work at once.

The Bessie G. shipped 32 sacks of high-grade gold-silver ore, which was packed by burro from the mine to Mayday, then hauled by truck to the Durango smelter. Paul Dalpra and associates have secured a lease on the Idaho and have a carload of ore which is expected to bring $50 per ton.

UTAH

Daly Mine Taken Over by Interests Close to Judge M. & S.—To Open Naildriver From Ontario

Eureka—Ore shipments from the Tintic district for the week ended Oct. 30 amounted to 129 cars, as compared with 174 cars (an unusually heavy tonnage) the week preceding.

The Iron King is doing considerable development on its lower levels and shipping about a car of fluxing iron ore daily from its tunnel level.

At the South Standard, southeast of the Tintic Standard, power connections have been completed to the site of the new shaft and machinery moved over. Buildings are to be erected, after which active development of the property is expected. The shaft of the Central Tintic Standard is down 600 ft. and drifting is expected to start soon on this level. The Copper Leaf has been working for some time to reach the northern extension of the Tintic Standard oil zone. This property is closing down for the present, but is expected to resume work about the first of the new year. The Pinion Queen, also in "east" Tintic, has its shaft down 800 ft., where some mineralization, mainly in silver, has been encountered. Drifting for a cross fissure will be started from the bottom of the shaft in the hope of opening a paying body.

Alta—The Emma Silver at its annual stockholders' meeting elected the following directors: A. L. Hoppaugh, J. E. Galligher, C. S. Burton, J. Herlihy and F. B. Cooke. George H. Dern resigned as manager. A report on the property by M. M. Johnson submitted to the stockholders advised the cessation for the present of work below the Bay City tunnel, owing to heavy expense due to water, and the undertaking of work on levels higher up to locate the faulted segments of orebodies to the north of the Emma body. Work in this section successfully prosecuted would give data for operation later on below the Bay City tunnel.

Park City—Shipments for the week ended Oct. 29 amounted to 1,634 tons of ore and concentrates, as compared with 1,718 tons the week before.

The Daly mine has been taken over by men closely allied with the interests in control of the Judge Mining & Smelting Co. G. W. Lambourne is president and Oscar Friendly mine superintendent. The Judge company is giving employment in its mine and mill to old employees released by the closing down of its electrolytic zinc plant, owing to the increased power costs allowed by the State Public Utilities Commission. Experimental work is being continued until more normal conditions return and the plant can be reopened.

Arrangements have been completed whereby lower levels in the Naildriver can be opened from the Ontario. A drift started in the Ontario and passing through unprospected ground here also will cut the Naildriver at about 1,300 ft., giving an additional depth of 400 ft. below the present workings.

The New Quincy has purchased a compressor and hoist, the latter electrically driven. A lease on the shaft and workings of the Little Bell will permit of work being done on a larger scale than heretofore. At present five or six men are being worked, and as soon as the new equipment is installed the number can be added to.

ARIZONA

United Verde Cuts Force—Denn-Arizona Shuts Down—Arizona Copper Curtails

Jerome—United Verde, now that it has its development work well advanced, has made a cut of 75 per cent in employment of unmarried men, curtailing its force by 30 per cent, which became effective Nov. 1. Arizona-Binghampton, east of Mayer, has also cut its force.

Bisbee — Denn-Arizona has shut down, laying off about 100 men, on account of the copper market. Shattuck-Arizona will continue to operate mine and mill.

Clifton—The Arizona Copper Co. has laid off a large number of men, mainly Mexicans.

Winslow—Heavy drilling equipment is being installed by the Crater Mining Co. on the lip of the meteoric crater. New housing has been provided and a water line has been brought in from Canyon Diablo. The first hole is to be in the upraised limestone crater lip on the south side, it being believed that the meteor sought came on a decided angle from the north. A number of years ago a company headed by D. M. Barringer, of Philadelphia, spent a large sum in trying to reach the nickel-iron mass assumed to be buried deeply in the bottom of the crater, which is about 3,800 ft. in diameter, with shattered walls uplifted 600 ft. above the floor. The lip is 130 ft. above the level of the surrounding plain. Below the earth of the crater floor is found what is locally termed "rock flour," so fine that it will sift through a 200-mesh screen. Shaft sinking proved impracticable and was abandoned at 200 ft. Drilling was prosecuted within the depression, but was hindered by the character of the material penetrated. Several of the twenty-five drill holes were bottomed on iron and others went through to the unaltered red sandstone. Chippings brought up had the same constitution as tons of fragments found on the plain, 92 per cent iron, with the balance mainly nickel, with platinum and iridium present to the extent of three-fourths of an ounce to the ton of metal. Estimates of the probable size of the meteor vary greatly. Fragments have been picked up more than five miles away. One of the largest pieces, weighing about half a ton, is in the Field Columbian Museum in Chicago.

Parker—A 125-ton leaching plant is being installed by T. J. Carrigan at

the Arizona Standard Copper's property to work a copper deposit said by Carrigan to have a large tonnage of carbonate and oxide ores that sample from 3 to 7 per cent.

Globe — Diamond drilling on the Castle Dome property is reported to have outlined an extensive sulphide deposit sampling 1.4 per cent copper, with a 20-ft. carbonate capping carrying 2½ per cent. Work has been suspended.

The Mine Operators Co. is installing an experimental leaching plant in the Mineral Creek section, where there are bodies of carbonate ores, capping the deeper sulphides.

Ajo—A cyanide plant is to be installed by A. W. Bramwell at the New Gunsight property.

A new hoist has been installed at the Copper Ridge property, formerly known as the Ajo-Cornelia.

NEW MEXICO

Snake & Opportunity Mines Stop Prospecting at Hillsboro

Silver City—The Maggie claim, located in Shingle Canyon, three and one-half miles from Fierro, is under option to Colorado zinc interests, represented by J. D. Harlan. The property will be drilled under contract by R. H. Hodge.

Hillsboro—The Snake & Opportunity Mines Co. have stopped prospecting and will ship all machinery to Helena, Mont. It is understood that the results of diamond drilling have not proven satisfactory. Nick C. Wallace, who has been in charge, will leave soon for Wallace, Idaho, to take charge of the Midnight property.

Rincon—The Ore Production Co. will start work on a tunnel to cut the vein on their fluorspar property at a depth of 300 ft. A. S. Sears, of San Francisco, who is interested, arranged for the financing of the work with Eastern parties.

MICHIGAN

The Copper District

Flotation To Be Tried on Amygdaloid Slimes—Geological Survey of Franklin Under Way

Houghton—For some years the shortage of trammers has been a serious condition in the copper district. Much thought and attention has been spent in developing mechanical devices which would decrease the manual labor involved. This has resulted in the use of mechanical haulage and mechanical shovels for some purposes. One of the largest operators in the district has developed a "stope scraper" which gives such promise that they are now building them on quite an extensive scale. This machine is built of a size to be operated by two men and will do the work of about eight trammers.

Some of the amygdaloid mines are planning to test the flotation process on their slimes soon. The flotation of the copper in the conglomerate slimes of the Calumet & Hecla and the shale formation of the White Pine Copper Co. has been a success. At the Calumet & Hecla the Minerals Separation process is used.

The Seneca Mining Co. has cut the lode with its 5th level crosscut.

The Franklin Mining Co. is having a geological survey made of its property. It has been shut down for considerable time except for the operation of the pumps. The result of this examination will determine the company's future policy, which will probably be announced soon.

MINNESOTA

Pickands-Mather May Deepen Rowe Shaft

Crosby—At the Portsmouth mine of the Gordon Mining Co. a drainage shaft has been sunk from the bottom of the present ore pit a depth of 75 ft. and a contract has been let for driving 200 ft. of drift from the bottom of shaft to drain the ore pit.

The Rogers-Brown Ore Co. has completed the loading of No. 1 and No. 2 grade stockpiles at its Meacham mine and has transferred its shovel to Cuyuna for loading the balance of Kennedy Mine stock.

Riverton — Pickands-Mather & Co. are considering deepening the Rowe mine shaft to the 375-ft. level and developing the orebody on this level. The shaft was completed to within 40 ft. of the proposed new level last spring, but since that time all work has been confined to active mining of the 220-ft. level.

JOPLIN-MIAMI DISTRICT

Oklahoma-Kansas-Missouri

Commonwealth Concentrator Ready—Federal S. & R. Closes Farmington Mine

Baxter, Kan.—The Commonwealth Mining Co. has completed the erection of its new concentrator just south of the Oklahoma-Kansas state line, south of Baxter Springs, and plans to start it at once. Only one shaft will be used for the present and the mill shaft, which is down only 40 ft., will probably not be completed before spring. The company has a 40-acre lease running for twenty years and is in no hurry to extract ore. Operations will be started at a depth of 150 ft.

Just north of this property a company, in which Charles M. Schwab is said to be interested, is drilling and good strikes have been unofficially reported.

Hockerville — The Federal Smelting & Refining Co. has temporarily closed its Farmington mine at Hockerville to curtail production. It is continuing to prospect by drilling on the Lucky Jenny and Choctaw Chief leases, which it recently took under option.

Miami, Okla.—Brick work has been started on the main building of the $100,000 School of Mines for Oklahoma located at Miami.

ILLINOIS

Strike Called Off at Hillside Fluorspar Mines

Elizabethtown—The strike has been called off at the Hillside Mines near Elizabethtown, Ill. The men wished to return to work and were told they could provided they would turn in their cards to the manager. The mines refused to recognize the union.

Chronology of Mining

October, 1920

Oct. 1. National Safety Congress closed 9th annual session at Milwaukee. —Independent Oil Men's Association meeting at Denver, Col., adjourned.

Oct. 4. New Mexico chapter of American Mining Congress organized at Silver City, N. M.

Oct. 9. Zinc and lead interests of the Mississippi Valley confer with Bureau of Mines officials at St. Louis concerning objectives of experiment station at Rolla, Mo.

Oct. 11. Lowell, suburb of Bisbee, Ariz., partly destroyed by fire.—Miners of Asbestos Corporation in Quebec strike.

Oct. 12. Colorado Metal Mining Association asked Western Trunk Line Committee to restore old freight rates within state.

Oct. 14. Oil producers and refiners meet big gas companies at American Petroleum Institute headquarters, New York City, to discuss oil supply.

Oct. 15. Joplin, Mo., zinc ore producers voted shut-down for two weeks. —St. Louis Section of A. I. M. E. held Fall meeting in the southeastern Missouri "Lead Belt"—General coal strike began in Great Britain.

Oct. 16. Copper Queen branch of Phelps Dodge Corporation announced layoff, effective Nov. 1, of part of steam-shovel force working on Sacramento Hill, Bisbee, Ariz.—Colorado Metal Miners Association filed application with Western Trunk Line Committee for hearing on re-adjustment of bullion rates between Colorado smelters and seaboard refineries.

Oct. 18. Canada Copper Corporation's new 2,000-ton concentrator at Allenby, B. C., began operation.—Canadian iron ore producers ask bounties of the Canadian Tariff Commission.—Subcommittee on standardization of petroleum specifications held open session at Washington, D. C., adjourning on Oct. 20.

Oct. 20. Utah Apex-Utah Consolidated suit decided in favor of former by Judge T. H. Johnson at Salt Lake City, Utah.—Ownership of Engineer group of claims in Atlin district, B. C., brought before courts.

Oct. 23. Judge Mining & Smelting Co., Salt Lake City, Utah, closed electrolytic zinc plant because of low prices and increasing costs.—Increased rates for power in Utah went into effect by order of Utah Public Utilities Commission.

Oct. 27. Two hundred jurymen drawn in the Bisbee, Ariz., deportation case.

THE MARKET REPORT

Daily Prices of Metals

Nov.	Copper, N. Y. net refinery*	Tin		Lead		Zinc
	E'ectrolytic	99 Per Cent	Straits	N. Y.	St. L.	St. L.
4	14.60@14.75	38.00	38.75@39.00	6.75	6.50@6.75	6 80
5	14.60	37.75	38.50@38.75	6.75	6.50@6.75	6.75
6	14 60	37.50	38.25@38.50	6.75	6.50@6.75	6.75
8	14.60	36.00	37.00@37.50	6.50@6.75	6.50@6.75	6 70
9	14.60	36.00	37.00@37.50	6.50@6.75	6.50@6.75	6.65
10	14.60	36.25	37.25@37.75	6.50@6.75	6.50@6.75	6.50@6.60

*These prices correspond to the following quotations for copper, "delivered": 14.75 @14.90, 14.75, 14.75, 14.75, 14.75 and 14.75c.

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for deliveries constituting the major markets, reduced to the basis of New York, cash, except where St. Louis is the normal basing point, or as otherwise noted. All prices are in cents per pound. Copper is commonly sold "delivered," which means that the seller pays the freight from the refinery to the buyer's destination.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. Tin is quoted on the basis of spot American tin, 99 per cent grade, and spot Straits tin.

London

Nov.	Copper			Tin		Lead		Zinc	
	Standard		Electro-lytic						
	Spot	3 M		Spot	3 M	Spot	3 M	Spot	3 M
4	92½	91⅝	100	259¼	263½	35⅛	35⅛	38	39⅜
5	90¼	89½	100	259	262¾	35¾	35	37¾	39¼
6	....			..		..		..	
8	90¼	89	100	251¾	256½	35¾	34¼	37½	38⅞
9	90½	89¼	100	245¾	251¾	35⅝	34⅜	36⅞	38¼
10	90	88¾	100	242½	247	35⅛	34½	36¾	38

The above table gives the closing quotations on the London Metal Exchange. All prices in pounds sterling per ton of 2,240 lb.

Silver and Sterling Exchange

Nov.	Sterling Exchange	Silver			Nov	Sterling Exchange	Silver		
		New York, Domestic Origin	New York, Foreign Origin	London			New York, Domestic Origin	New York, Foreign Origin	London
4	342	99½	82⅝	54⅛	8	334	99½	80¾	53⅞
5	341	99½	82	53⅞	9	336	99½	80¾	53¾
6	338	99½	82	54⅜	10	338½	99½	82¼	54⅜

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

Metal Markets

New York, Nov. 10, 1920

Reports of further price cutting in various industries and a decided slump in the stock market have made the metal market weaker during the last week, and it is difficult to find a note of optimism. Costs now have absolutely no bearing on prices, and the fact that zinc and copper are selling below the present cost of production does not make them a bargain in the eyes of possible buyers. The better feeling which we roported last week seems to have been largely a sentimental one following the election. It is now the general opinion that better prices can hardly be expected before next spring.

Copper

The rather general buying of the last two or three weeks is subsiding, and the present sales are mostly of small volume to customers who were slow in getting into the market. Copper can be bought freely now, even from the large producers, at 14.75c. delivered. Speculators are showing a tendency to come into the market at present levels, and it is likely that if the price were further reduced a large speculative demand would develop. Producers consider that the recent reduction from 18½ to 15c. was a good move, inasmuch as it not only resulted in selling considerable copper but also proved that the sellers were willing to do their share in the general price reduction movement.

Metal for forward delivery is nominally held at ¼c. advance over the prices which we quote, but it is likely that, on orders of any size, sellers would not insist on this premium.

Export demand has been a little better, but the reports of large tonnages sold in Europe are said to be exaggerated, and circulated purely for stock-market purposes.

Lead

On Monday, Nov. 8, the A. S. & R. official price was reduced from 7¼c. to 7c. New York. The St. Louis price remains at 7c., the smelting company feeling that under present conditions, with imported lead arriving here, the St. Louis price is on a parity with that in New York. St. Louis is not a large market for desilverized lead, dealing there being more in chemical lead, which is now commanding a premium of about ¼c., as we mentioned last week.

Less lead has been sold during the last few days than for some time.

Zinc

Demand has been even weaker than usual, and daily concessions in price had to be made to attract purchasers. Many producers continue unwilling to sell at current levels.

Correction: The average price of zinc, St. Louis, for October was incorrectly given as 7.650c. last week. The correct figure is 7.150c.

An Appreciation

THE United States Geological Survey would like to express its appreciation of the improvement in the section "The Market Report," under which is given most helpful information on an increasing number of mineral products. Another section of particular interest to the Survey is "Current Prices of Materials and Supplies." Your publication has long been of great assistance to this bureau, but is found to be of greater use than ever before.

Yours very truly,

GEORGE OTIS SMITH,

Director

Tin

On a declining market, business has been fairly active, with some consumer demand. Futures continue to be preferred to near-by delivery. Banca tin is now very scarce, and is reported commanding a slight premium in London, whereas a few months ago the market was flooded with this variety. Demand for 99 per cent grades has been fairly good, and some electrolytic has been sold at approximately the same prices as for Straits.

Straits tin for future delivery: Nov. 4th, 40.75@41c.; 5th, 40.25@40.50c.; 6th, 39.75@40c.; 8th, 38.75@39.25c.; 9th, 38.50@39c.; 10th, 38.50@38.75c.

Arrivals of tin in long tons: Nov. 1st, Straits, 230; China, 15; 8th, Straits, 1,900; China, 5.

Silver

For the last week the London quotation has remained fairly steady at about 54d., until Nov. 10, when it advanced to 54⅝d. on account of China buying, according to reports. Sterling exchange has played an important part in the New York price. China banks have continued to buy at a premium over the London parity, but the inquiry from this quarter narrowed considerably at the higher level. Up to the close of business Nov. 6, purchases by the U. S. Government under the Pittman Act amounted to 22,527,231 oz.

Mexican Dollars—Nov. 4th, 62⅜; 5th, 67⅛; 6th, 62½; 8th, 61¼; 9th, 61¼; 10th, 62⅜.

Gold

Gold in London: Nov. 4th, 119s. 6d.; 5th, 120s.; 8th, 122s. 4d.; 9th, 122s. 4d.; 10th, 121s. A considerable quantity of gold is now arriving here from Europe. Bankers are buying South African gold in the open London market.

Foreign Exchange

Almost all foreign money declined materially during the last week, in several instances touching new lows. The declining tendency is, in general, the result of a continued preponderance of American exports to Europe over imports. On Tuesday, francs were 5.86c.; lire, 3.42c.; and marks, 1.15c. New York funds in Montreal, 11 5/16 per cent premium.

Other Metals

Aluminum—For 50-ton lots: ingot, 99 per cent and purer, 33.1c.; 98@99 per cent, 32.90c. Outside sales reported at 31c. for both grades.

Antimony — Chinese and Japanese brands, 6½@6¼c.; W. C. C. brand, 8c. per lb. Cookson's "C" grade, 12½@13c. Chinese needle antimony, lump, nominal at 6@6½c. per lb. Standard powdered needle antimony[1] (200 mesh), 9c. per lb. Market dull.

White antimony oxide, Chinese, guaranteed 99 per cent Sb_2O_3, wholesale lots, 9½@10c.

Bismuth—$2.55 per lb., 500-lb. lots, and $2.57 per lb., 100-lb. lots.

Cadmium—Nominal, $1.40@$1.50 per lb. Market steady.

Cobalt—Metal, $6 per lb.; black oxide, $4.10 per lb.; sulphate, $1.60.

Iridium—Nominal, $350@$400 per oz.

Magnesium—Crude, 99 per cent or over pure, $1.75 per lb. for 100 lb. lots and over, f.o b. Niagara Falls.

[1]**Molybdenum Metal** in rod or wire form, 99.9 per cent pure, $32@$40 per lb., according to gage.

Nickel—Ingot, 43c.; shot, 43c.; electrolytic, 45c., f.o.b. Bayonne, N. J.

Monel Metal—Shot, 35c.; blocks, 35c., and ingots, 38c. per lb., f.o.b. Bayonne.

Osmium—Open market, $50@$75 per troy oz.

Palladium—$80@$85 per oz. Dull.

Platinum—Firm at $85@$90 per oz.

Quicksilver—Market quiet; $58@$60 per 75-lb. flask. San Francisco wires $55@$63. Market quiet.

Ruthenium—$200@$220 per troy oz.

[1]**Selenium**—Black powdered, amorphous, 99.5 per cent pure, $2@$2.25 per lb. Demand strong.

[1]**Thallium Metal**—Ingot, 99 per cent pure, $20 per lb.

[1]**Tungsten Metal**—$35@$60 per kilogram, according to purity and gage.

Metallic Ores

Chrome Ore—Guaranteed 50 per cent Cr_2O_3 foreign ore with a maximum of 6 per cent silica, 65@75c. per unit, New York. California concentrates, 50 per cent Cr_2O_3 and upward, 70@75c.

Manganese Ore[1]—60@70c. per unit, seaport; chemical ore (MnO_2) $70@$80 per gross ton, lump; $80@$90 per net ton, powdered.

Molybdenum Ore—85 per cent MoS_2, 65@70c. per lb. of contained sulphide, New York.

[1]**Tantalum Ore**—Guaranteed minimum 60 per cent tantalic acid, 55@65c. per lb. in ton lots.

[1]**Titanium Ores**—Ilmenite, 52 per cent TiO_2, 1¼@2c. per lb. for ore. Rutile, 95 per cent TiO_2, 15c. per lb. for ore, with concessions on large lots or running contracts.

Tungsten Ore—Scheelite, 60 per cent WO_3 and over, per unit of WO_3, $6 f.o.b. mines; wolframite, 60 per cent WO_3 and over, per unit of WO_3, $4.50@$5.50, in New York.

Uranium Ore (Carnotite)—$2.75@$3 per lb. for 96 per cent of the contained oxide (U_3O_8). Ores must contain a minimum of 2 per cent U_3O_8.

Vanadium Ore—$2 per lb. of V_2O_5 (guaranteed minimum of 11 per cent V_2O_5), New York.

[1]**Zircon**—Washed, iron free, 5c. per lb.

[1]**Zirkite**—According to conditions, $80 @$90 per ton, carload lots. Pure white oxide, 99 per cent, is quoted at $1.15 per lb. in ton lots.

Zinc and Lead Ore Markets

Joplin, Mo., Nov. 6—Zinc blende, per ton, high, $47.90; basis 60 per cent zinc, premium, $41; Prime Western, settling, $47.50@$40; buying, $40; fines and slimes, $37.50@$35; calamine, basis 40 per cent zinc, $35. Average settling prices: Blende, $45.21; calamine, $38.96; all zinc ores, $45.02.

Lead, high, $104.25; basis 80 per cent lead, settling, $100@$65; buying, $65; average settling price, $94.25 per ton.

Shipments for the week: Blende, 10,025; calamine, 173; lead, 926 tons. Value, all ores the week, $546,600.

With the mines closed down and the bulk of the lead loaded from advance purchases, the average settling price was advanced in the face of a weak buying market. Zinc buying aggregated 6,700 tons, practically the same as last week. Producers claim the output is being kept under 8,000 tons per week, but that exceeds sales, and is not reducing the stock.

Platteville, Wis., Nov. 6—Blende, basis 60 per cent zinc, $45 base for high grade. Lead ore, no sales reported. Shipments for the week: Blende, 854 tons. Shipments for the year: Blende, 57,925; calamine, 2,504; lead, 4,428; sulphur ore, 1,342 tons. Shipped during the week to separating plants, 2,080 tons blende.

Non-Metallic Minerals

Asbestos—Crude, No. 1, $2,000@$3,000; No. 2, $1,400@$1,700; spinning fibres, $400@$800; magnesia and compressed sheet fibres, $325@$400; shingle stock, $110@$150; paper stock, $60@$75; cement stock, $17.50@$30; floats, $8.50@$15, all per short ton, f.o.b. Thetford, Broughton, and Black Lake mines, Quebec, Canada; 5 per cent to be added as Canadian royalty export sales tax.

Barytes—Crude, 88 to 94 per cent barium content, $10@$12 per net ton; ground (white) $24@$30 in bags, carload lots; (off-color) $22@$26 in bags, carload lots; all f.o.b. Kings Creek, S. C. Crude, 88 to 94 per cent, $23; ground (white), $45; ground (off color) $30@$32 per net ton, less than carload lots, f.o.b. New York. Crude, first grade, $10 per ton, f.o.b. cars, Missouri; floated, $28 per ton in bbls.; $26.50 per ton in 100-lb. bags; extra charge for bags, f.o.b. St. Louis.

Chalk—English, extra light, 5@7c.; light, 5@6c.; dense, 4½@5c. per lb., all f.o.b. New York.

China Clay (Kaolin)—Crude, $9@$12; washed, $12@$15; powdered, $18@$22; bags extra, per net ton, f.o.b. mines, Georgia; crude, $8@$12; ground, $15@$40, f.o.b. Virginia points. Domestic lump, $10@$20; powdered, $25@$30; imported lump, $25@$35; powdered, $30@$60, f.o.b. New York.

Feldspar—Crude, $8@$14 per gross ton, f.o.b. Maryland and North Carolina points; $7.50@$10, f.o.b. Maine; ground, $27@$30, car lots, f.o.b. Baltimore; ground, $17@$21, f.o.b. North Carolina points; $17@$21 per ton, No. 1 ground, f.o.b. New York State; $21@$23 per ton, ground, f.o.b. Maine. Crude spar very scarce.

Fluorspar — Gravel, guaranteed 85 per cent calcium fluoride and not over 6 per cent silica, $25 per ton, f.o.b Illinois mines, and $27.50, f.o.b. Kentucky; ground, suitable for acid, chem-

[1]Furnished by Foote Mineral Co., Philadelphia, Pa

ical or enameling purposes, $60; lump, $17.50, f.o.b. Tonuco, N. M. In Canada 85 per cent calcium fluoride sells for $20 per ton f.o.b. Madoc; output limited. Canadian price generally $18 (Canadian currency) per ton, f.o.b. mines; market inactive.

Graphite—The 90 per cent crucible grade is held in Alabama for 9c. per lb. and 85 per cent grade is practically unobtainable, prices being 7@9c. The higher lubricating grades sell for 11@40c., according to carbon content.

Gravel—No analysis guarantee, f.o.b. Roseview, Ill., $25 per ton; gravel suitable for acid, chemical or enameling purposes, $60.

Gypsum—Plaster of paris in carload lots sells for $4.25 per 250-lb. bbl., alongside dock, New York. Raw crushed rock, $3.50@$4.50; calcined stucco, $9; f.o.b. works, Illinois.

Kaolin—See China Clay.

Limestone—Dolomite, 1@2 man size, $1.60@$1.65; 2@8 in., $1.55@$1.65 per net ton, f.o.b. Plymouth Meeting, Pa.; fluxing, $1.65@$1.75 per net ton, f.o.b. Howellville, Pa.

Magnesite, Calcined — High-grade caustic calcined, lump form, $35@$40 per ton, carload lots, f.o.b. California points. In Chicago district, $57.70; Atlantic seaboard, $61@$63.

Dead-Burned — $32.50 per net ton, Chewelah, Wash.; $52@$58, Chester, Pa. Austrian grade, $52@$55 per ton, f.o.b. Baltimore. (Magnesite brick—See Refractories.)

Mica—India block mica slightly stained, per lb.: No. 6, 50c.; No. 5, $1.20@$1.40; No. 4, $2@$3; No. 3, $4.25@$5; No. 2, $5.50@$7; No. 1, $8. Clear block: No. 6, 55c.; No. 5, $2; No. 4, $3.50; No. 3, $5, No. 2, $6.50; No. 1, $8; A1, $10; extra large, $25, all f.o.b. New York; ground, $150 per ton, Philadelphia. Domestic, uncut, f.o.b. Franklin, N. C., as follows: Scrap, $45@$50 per ton; punch, 10c. per lb.; circle, 15@25c.; 1½ x 2 in., 75c.; 2 x 2 in., $1.15; 2 x 3 in., $1.65; 3 x 3 in., $2.10; 3 x 4 in., $2.50; 3 x 5 in., $2.75; 3 x 6 in., $3.75; ground 165 mesh, $240 per ton; ground roofing mica, $60; mica washers, 75c.@$2 per lb.; 1¼-in. disks, No. 1, $1.60 per lb.; No. 2, $1.30. The foregoing domestic prices obtain also in the Chicago district.

[1]**Monazite** — Minimum of 6 per cent thorium oxide, $35 per unit, duty paid.

Phosphate Rock—Per long ton, Florida ports: 77 per cent tricalcium phosphate, $13; 75 per cent, $11.50; 75@74 per cent, $11; 70 per cent, $8.35; 68 per cent, $7.85; 68@66 per cent, $7.60. Finely ground Tennessee rock sells for $8.50 per net ton for 13 per cent phosphorus content, agricultural application; for acid-making, 14 per cent, $9; both prices f.o.b. Centerville, Tenn.

Pumice Stone—Imported, lump, 4@50c. per lb.; domestic lump, 6c.; ground, 4@7c., all f.o.b. New York.

Pyrites—Spanish fines, per unit, 12c., c.i.f. Atlantic seaport; furnace size, 17c.; Spanish lump, 14@16c.; domestic fines, f.o.b. mines, Georgia, 12@14c. Market improving.

Quartz—(Acid tower) fist to head, $10; 1½ to 2 in., $14; rice, $17, all net ton, f.o.b. Baltimore; lump, carload lots, $5@$7.50 net ton, f.o.b. North Carolina mines.

Sand (Glass)—Dry glass sand, $4 per net ton, f.o.b. cars Mapleton, Pa. Sand, f.o.b. Ottawa, Ill., is $3 per ton; $2.50 on annual contracts. Sand at Klondike. Gray Summit and Pacific, all in Missouri, is $2.50 on contract; some outside sales have been made at $4. St. Louis, open market, at $3.50; contract price on large quantities, $2.50; on small quantities, $3.

Sulphur—$18 per ton for domestic; $18@$20 for export, f.o.b. Texas and Louisiana mines. Market quiet.

Talc — Paper making, $12@$22 per ton; roofing grades, $9.50@$15; rubber grades, $12@$18, all f.o.b. Vermont. California talc, $20@$45, talcum powder grade. Southern talc, powdered, carload lots, $12@$15 per ton; less than carload, $25, f.o.b. cars; freight to New York $5.25 per ton, carload lots; less than carload lots, $9.25. Imported, $60@$70; Canadian, $20@$40 per ton.

Mineral Products

Arsenic—White arsenic, 14@14½c. per lb.; sulphide, powdered, 18@19c. per lb. in carload lots.

Sodium Nitrate—$3 per cwt., ex vessel, Atlantic ports. Market quiet.

Sodium Sulphate—For 95 per cent material, $22 per ton, f.o.b. mines, Idaho and Arizona, spot and six months' contract.

Potassium Sulphate—Domestic, $225@$250 per net ton, basis 90 per cent, f.o.b. New York.

Ferro Alloys

Ferrocarbontitanium—For 15 to 18 per cent material, $200@$225 per ton, f.o.b. Niagara Falls, N. Y.

Ferrocerium—Per lb., $12@$15. Foreign conditions as affecting the price of American goods remain unchanged.

Ferrochrome—Carload lots, spot and contract, 60 to 70 per cent chromium, 6 to 8 per cent carbon, 18@19c. per lb. of chromium contained; 4 to 6 per cent carbon, 17@18c., f.o.b. works.

Ferromanganese—Domestic 76 to 80 per cent, $175, freight allowed; $170, f.o.b. seaboard bases; English, $165@$170, c.i.f. Atlantic seaports. Spiegeleisen, 18@22 per cent, $75@$80, f.o.b. furnace.

Ferromolybdenum[1]—Standard grades, carrying from 50 to 60 per cent molybdenum metal, with low sulphur, phosphorus, and arsenic, $2.25@$2.50 per lb. of contained metal, f.o.b. works.

Ferrosilicon—For 10 to 15 per cent, per gross ton, f.o.b. works, $60@$65; 50 per cent, $80@$85; 75 per cent, $160.

Ferrotungsten[1]—Domestic, 70 to 80 per cent W, 75@90c. per lb. of contained tungsten, f.o.b. works. Foreign, 70c.

Ferro-uranium—35 to 50 per cent U, $7 per lb. of U contained, f.o.b. works.

Ferrovanadium[1]—Basis 30 to 40 per cent, $6.50@$8 per lb. of V contained, f.o.b. works.

[1]Furnished by Foote Mineral Co., Philadelphia, Pa.

Metal Products

Copper Sheets — Current New York price, 25½c. per lb.; wire, 19c.

Lead Sheets—Full lead sheets, 10½c.; cut lead sheets, 10¾c. in quantity, mill lots.

Nickel Silver—Unchanged at 36½c. per lb. for 18 per cent nickel.

Yellow Metal — Dimension sheets, 23¼c.; sheathing, 23¼c.; rods, ⅝ to 3 in., 20¼c.

Zinc Sheets—$12.50 per 100 lb., less 8 per cent on carload lots, f.o.b. smelter; zinc plates, 12c. per lb.

Refractories

Bauxite Brick—56 per cent alumina, $160 per 1,000, f.o.b. Pittsburgh.

Chrome Cement—40@45 per cent Cr_2O_3, $55@$60 per net ton, and $65 in sacks, carload lots, f.o.b. eastern shipping points.

Fire Brick—First quality, 9-in. shapes, $55@$60 per 1,000, Pennsylvania, Ohio and Kentucky. Second quality, $45@$50.

Magnesite Brick — 9-in. straights, $110 per net ton; 9-in. arches, wedges and keys, $121; soaps and splits, $134.

Silica Brick—9-in., per 1,000: Chicago district, $65@$70; Birmingham, Ala., $56@$61; Mount Union, Pa., $55@$60.

Iron Trade Review

Pittsburgh, Nov. 9, 1920

The decreased demand for steel which has been the feature of the market for some time is reflected more in decreasing mill operations than in declines in prices of the independent manufacturers. Prices for sheets are constantly falling, 6c. being now possible on black sheets for prompt shipment by some independent mills, galvanized being about 1.50c. higher, and heavy gages of blue annealed sometimes sell down to 4c.

Prices of independent steel producers will hardly be down to the Steel Corporation level, in all cases, before March or April.

Pig Iron—Bessemer has been offered at $42 Valley, or $3 further decline. Basic sold in a 2,000-ton lot at $38.50, or $1.50 decline. On an inquiry for 1,000 tons November and December foundry, as low as $41 was quoted by producers. We quote: Bessemer, $42; basic, $38.50; foundry, $41, f.o.b. Valley furnaces, with $1.96 freight to Pittsburgh. A common expectation is that pig iron will find a stable level at within $1 or $2 either way of $30 Valley, though the process may possibly require several months.

Semi-finished Steel—The market is altogether stagnant, with prices practically nominal at $55 for billets, $65 for sheet bars, and $70 for rods.

Charcoal and Coke

Charcoal—Willow, 7c. per lb. in bbls.; hardwood, 6c. per lb., in 250-lb. bbls.

Connellsville — Furnace, $16.50@$17; foundry, $18.

Market for Feldspar

Kinds and Grades—Where Produced—Heavy Demand and High Quotations—Prices Now Ruling

FELDSPAR, used principally in the manufacture of pottery, chinaware, porcelain, enamel ware, and enamel brick and tile, is of three varieties: potash feldspar, containing potash as well as aluminum; albite, containing soda and aluminum; and soda lime feldspar, containing a mixture of soda and lime, as well as aluminum. In the trade, feldspar is divided into two classes, potash and soda. A typical potash feldspar contains eight to eleven parts K_2O, and two to three parts soda; whereas soda spar has three or four parts less of potash and more of soda. Each kind of feldspar is subdivided into two grades. The first grade is hand picked, and the impurities are removed; the second grade, sometimes called "regular," is run-of-mine. Occasionally, there is a medium grade. North Carolina is the largest producing state, with Maine, New York, Maryland, Connecticut, Pennsylvania, and California about in the order named. The United States is the largest producer, with the United Kingdom, Scandinavia, and Canada following.

World production in 1913 amounted to 210,870 long tons, of which the United States is credited with 108,000. In 1918 this country produced 88,498 in a world total of 161,075 long tons. The decrease was caused by scarce labor, curtailment of fuel supply to the pottery industry, and shortage of railway cars.

Heaviest Demand Ever Known

The demand for feldspar was never before so strong as now, and producers are ever on the lookout for new deposits. There are numerous discoveries of small quantities of spar, but, except where transport facilities are exceptional, the dimensions of a deposit should be such as to make possible the simplest quarrying methods. In fact, the deposit should be at least 25 ft. thick and free from such deleterious minerals as mica, garnet, pyrites and other minor substances. Anyone discovering a deposit of feldspar should ascertain its dimensions before trying to find a market.

Crude feldspar is sold by the long ton; ground feldspar by the short ton. At present, North Carolina crude is quoted at $7 to $8 per ton, f.o.b. mines; Canadian crude sells for the same price at mines, Canada. In the Ohio district ground feldspar sells for $24 to $26 per ton f.o.b. cars at mill. Ground feldspar sells for $25 per ton in Maine, and $21@$23 per ton in New York. Contracts used to be entered into between producers and purchasers for a year's supply; then the period was reduced to six months, and at present the general practice seems to be to charge the price effective at the time of shipment. This is indicative of the present heavy demand for feldspar and of an insufficient supply.

Mines of Huanchaca-Pulacayo, Bolivia

The mining district of Huanchaca-Pulacayo lies in the Province of Porco, Bolivia, and consists of some of the oldest and most famous mines of that country. The deposits according to Commerce Reports, were worked by the natives before the coming of the Spaniards, and were later exploited on a large scale by the Spaniards themselves. After a period of suspension, work was resumed in the 80's of the last century by a French company, which eventually disposed of the properties to the present Chilean owners. The production of ores, which run from 5 per cent and upward of silver, is between 1,500 and 2,000 metric tons per month. Most of the ore is sold to American interests. Enormous dumps below the mouth of the mine at Pulacayo contain about 22 oz. of silver to the ton, and several companies, including British and American interests, are understood to have made proposals recently for working them by modern methods of recovery.

Movements of Ores and Metals In September

Imports and exports of the more important metals and ores, to and from the United States, as reported by the Department of Commerce for September, 1920, and the figures for September, 1919, as finally revised, are as follows:

IMPORTS, SEPTEMBER, 1919 AND 1920

(In Pounds Unless Stated Otherwise)

	Sept., 1919	Sept., 1920
Antimony ore, contents	28	685,581
Antimony matte, regulus or metal	393,070	1,020,012
Copper:		
Ore, contents	3,712,966	5,368,657
Concentrates, contents	2,789,346	3,151,503
Matte, regulus, etc., contents	6,445,780	1,612,617
Imported from (in part):		
Canada	2,194,122	2,374,342
Mexico	9,396,950	4,037,912
Cuba	87,392	127,680
Chile	891,200	2,619,099
Peru	55,868	30,165
Unrefined, black, blister, etc	22,686,470	16,059,779
Refined, in bars, plates, etc	869,157	2,786,177
Old, etc., for remanufacture	199,324	1,509,444
Composition metal, copper chief value	1,896	73,466
Lead:		
Ore, contents	1,414,137	6,396,981
Bullion, contents	21,476,853	14,998,560
Imported from (in part):		
Canada	1,531,828	576,477
Mexico	21,359,162	15,595,399
Chile	.....	1,057,048
Pigs, bars and old	2,622,636	17,125,245
Manganese ore, long tons	19,601	88,422
Imported from (in part):		
Brazil, long tons	16,786	61,800
British India, long tons	500	7,300
Cuba, long tons	275	75
Tungsten ore, long tons	818	360
Pyrites, long tons	28,658	14,433
Imported from (in part).		
Spain, long tons	20,583	883
Canada, long tons	8,061	10,700
Tin ore, long tons	4,036	2,292
Tin bars, blocks, pigs, etc	11,244,146	9,596,819
Imported from (in part):		
United Kingdom	5,568,911	952,504
Straits Settlements	4,730,489	6,034,850
Dutch East Indies	743,524	218,800
Hongkong	10,822	1,432,739
Australia	190,400	190,400
Zinc:		
Ore, contents	1,910,486	3,753,221
Imported from		
Canada	424,258	283,886
Mexico	1,486,228	3,469,335
Blocks or pigs, and old	34,477	500

EXPORTS OF COPPER, LEAD, AND ZINC

(In Pounds)

	Sept., 1919	Sept., 1920
Copper:		
Ore, contents	3,000	36,000
Concentrates, contents	52,460	166,381
Unrefined, black, blister, etc	.....	2,700
Refined, in ingots, bars, etc	62,341,191	19,128,143
Exported to (in part):		
Italy	13,051,699	.....
France	8,317,911	4,659,360
Sweden	9,369,602	2,964,343
United Kingdom	2,814,973	3,326,631
Japan	25,028,735	.....
Composition metal, copper chief value	10,928	6,269
Old and scrap	201	2,463
Pipes and tubes	641,448	360,729
Plates and sheets	307,742	2,812,249
Wire, except insulated	2,522,305	2,142,898
Lead:		
Pigs, bars, etc.:		
Produced from domestic ore	744,815	773,879
Produced from foreign ore	8,648,828	1,493,600
Exported to (in part):		
France	448,000	.....
United Kingdom	224,000	672,000
Argentina	1,008,000	336,000
Brazil	112,000	380,800
Japan	7,375,295	672,000
Canada	149,701	37,683
Zinc:		
Dross	110,613	1,513,279
Spelter:		
Produced from domestic ore	19,034,689	2,240,800
Produced from foreign ore	1,486,337	955,055
Exported to (in part):		
France	160,137	1,008,000
United Kingdom	5,320,504	786,979
Mexico	400	58,300
Japan	14,794,410	.....
In sheets, strips, etc	3,392,428	1,104,515

COMPANY REPORTS

Kerr Lake Mines, Ltd., Ore Reserves Decreasing

Silver: Canada

The report of Kerr Lake Mines, Ltd., for the fiscal year ending Aug. 31, 1920, states that because of the gradual exhaustion of the reserves of both high- and low-grade ore at the Cobalt property, the amount of silver produced during the past year has been considerably less than during the previous year, and the cost of production higher.

Gross production for the year amounted to 956,049.92 oz. of silver, 42,654 lb. of cobalt, and 34 lb. of mercury. There was 23,151 tons of ore hoisted, at a mining cost of $10.52 per ton. Costs of production per ounce on the basis of entire production amounted to

Mining and development	25.48c.
Shipment and treatment	26.69c.
Administration and general expense	3.87c.
Total	56.04c.

A subsidiary company, the Kerr Lake Mining Co., reports:

KERR LAKE OPERATING AND PROFIT AND LOSS ACCOUNT

Cost of production and development		$243,627.23
Shipment, treatment and other charges		115,654.38
Administration and general expense		36,981.86
Expenses in lake drainage		5,580.79
Exchange		21,386.20
Estimated for taxes		50,000.00
Balance being profit transferred to balance sheet		618,052.08
Total		$1,091,282.54
Proceeds of ore sales		$1,236,859.84
Less: Ore on hand Aug. 31, 1919	$320,285.47	
Plus: Ore on hand Aug. 31, 1920	82,174.65	
Interest		92,533.52
		$1,091,282.54

Dividends paid by Kerr Lake Mining Co. amounted to $1,000,000, all of which was paid to Kerr Lake Mines, Ltd., which transferred $916,089.23 to profit and loss account in the following manner:

Dividends received from Kerr Lake Mining Co		$1,000,000.00
Interest		11,743.12
Total		1,011,743.12
Less:		
Administration and general expense		39,606.17
Sundry mine examinations		56,047.72
Balance		$916,089.23

Kerr Lake Mines, Ltd., now has $432,000 invested in the Tahoe Mine, Utah, and has advanced $278,986.15 to the Rimu Gold Dredging Co., New Zealand.

New Jersey Zinc Co. Shows Surplus of $31,873.68 for Third Quarter

Zinc; New Jersey

A report of the New Jersey Zinc Co. for the quarter ending Sept. 30, 1920, shows a surplus after payment of dividends amounting to $31,873.69. The statement follows:

Income (including dividends from subsidiary companies) after deductions for expenses, taxes, maintenance, repairs and renewals, betterments, depreciation and contingencies		$1,826,873.69
Deduct:		
Interest on first mortgage bonds	$40,000.00	
Reserve for retirement of bonds	75,000.00	115,000.00
Balance		$1,711,873.69
Dividends:		
Quarterly 4 per cent, payable Nov. 10, 1920		1,680,000.00
Surplus for the quarter		$31,873.69

NOTE: Reserve for Federal taxes has been sufficiently covered by the sums reserved in the first and second quarters of this calendar year.

Wallaroo & Moonta Records Deficit

Copper: Australia

The thirty-first annual report of the Wallaroo & Moonta Mining & Smelting Co., a British corporation, shows a deficit for the fiscal year ending June 30, 1920, of £38,914 2s. 8d. The Wallaroo Smelting Works produced 2,302 tons of refined copper, 301 oz. of gold, and 2,430 tons of sulphuric acid, from a total of 23,731 tons of ore mined or purchased. The output of copper was sold to the Copper Producers' Association.

Two dividends totaling 3s. per share were declared during the year on the 160,000 shares of £2 par value each outstanding. The surplus of £150,661 7s. on June 30, 1919, was reduced to £87,747 4s. 4d. on June 30, 1920.

The profit and loss account for the fiscal year follows:

DEBIT

	£	s.	d.
Working expenses	311,563	9	0
Adelaide office expenses, including directors' and auditors' fees, salaries, rent, and general business charges	4,979	15	2
Special charges	2,030	14	3
Royalty on mineral leases for 1919-20	200	0	0
State income tax, 1918-19	508	13	11
Interest and discount	3,773	4	8
Total	£323,055	17	0

	£	s.	d.
Balance of trade accounts	266,060	14	2
Federal income tax (refund account, 1917)	5,130	13	11
War-time profits tax (refund account, 1915-16)	12,950	6	3
Balance-reserve of accumulated profits	38,914	2	8
Total	£323,055	17	0

International Nickel Co. Shows Profit

Nickel; Canada, United States

A report of the International Nickel Co. for the six months ending Sept. 30, 1920, shows a profit of $2,262,017.89 on $8,912,600 of preferred and $41,834,600 common stock outstanding. Profit and loss statement follows:

Earnings		$3,729,675.00
Other income		464,300.06
Total income		$4,193,975.06
Administration and general expenses	$316,952.73	
Reserved for U. S. and foreign taxes (estimated)	460,665.84	777,618.57
Net income		$3,416,356.49
Depreciation and mineral exhaustion		1,154,338.60
Profits		$2,262,017.89

DIVIDENDS

Preferred No. 59— Paid Aug. 2, 1920	$133,689.00	
Preferred No. 60— Payable Nov. 1, 1920	133,689.00	267,378.00
Balance		$1,994,639.89

A consolidated general balance sheet of Sept. 30, 1920, follows:

ASSETS

Property	$48,364,300.34
Investments	1,603,705.06
Inventories	9,753,204.74
Accounts receivable	1,982,328.50
Loans on call	3,015,000.00
Cash	2,182,376.44
Total	$66,900,915.08

LIABILITIES

Preferred stock	$8,912,600.00
Common stock	41,834,600.00
Accounts payable and tax reserves	3,006,349.79
Preferred dividend No. 60, payable Nov. 1, 1920	133,689.00
Accident and insurance funds	377,803.02
Exchange reserve	250,000.00
Surplus April 1, 1920	10,391,233.38
Profit and loss (balance as per statement)	1,994,639.89
Total	$66,900,915.08

MINING STOCKS

Week Ended November 6, 1920

Stock	Exch.	High	Low	Last	Last Div.	
COPPER						
Adventure	Boston	...	...	*60	...	
Ahmeek	Boston	58½	56	57½	Sept. '20, Q	.50
Alaska-B.C.	N. Y. Curb	⅛	⅛	⅛	...	
Allouez	Boston	23⅞	23⅝	23⅝	Mar. '19,	1 00
Anaconda	N. Y.	51½	50	51½	Aug. '20, Q	1 00
Ariz. Com'l	Boston	9¼	9	9¼	Oct. '18,	.50
Big Ledge	N. Y. Curb	7/16	3/8	7/16	...	
Bingham Mines	Boston	9⅛	9⅛	9⅛	Sept. '19, Q	.25
Calumet & Ariz.	Boston	55	54	54	Sept '20, Q	1 00
Calumet & Hecla	Boston	260	250	251	June '20, Q	5 00
Canada Copper	N. Y. Curb	...	...	⅛	...	
Centennial	Boston	9⅛	9⅛	9⅛	Dec. '18, SA	1 00
Cerro de Pasco	N. Y.	39⅛	38	38	Sept. '20, Q	1 00
Chief Consol	Boston Curb	3	3	3	Nov. '20, Q	.10
Chile Copper	N. Y.	14⅛	13⅜	14	...	
Chino	N. Y.	26⅛	24⅛	25½	Sept '20, Q	.37½
Columbus Rexall	Salt Lake	*35	*34	*34	...	
Con. Ariz.	N. Y. Curb	1/16	1/32	1/32	Dec. '18, Q	.05
Con. Copper M.	N. Y. Curb	...	...	*61	...	
Copper Range	Boston	34½	33½	34	Sept. '20, Q	.50
Crystal Copper	Boston Curb	*65	*42	*61	...	
Davis-Daly	Boston	7⅛	7	7⅛	Mar. '20, Q	.25
East Butte	Boston	10¼	9	9	Dec. '19, A	.50
First Nat'l	Boston Curb	*85	*80	*80	Feb. '19, SA	.15
Frankl'n	Boston	3	2⅛	2⅛	...	
Gadsden Copper	N. Y. Curb	...	...	*70	...	
Granby Consol	N. Y.	...	...	28	May '19, Q	1.25
Greene Cananea	N. Y.	28⅛	25⅛	25⅛	Aug. '20, Q	.50
Hancock	Boston	4	4	4	...	
Houghton	Boston Curb	...	...	*45	...	
Howe Sound	N. Y. Curb.	3¼	3¼	3¼	Oct. '20, Q	.05
Inspiration Con.	N. Y.	43¼	42⅛	42⅛	Oct. 20, Q	1.00
Iron Cap	Boston Curb	...	...	8	Sept. '20, K	.25
Isle Royale	Boston	24⅛	23⅛	24	Sept. '19, SA	.50
Kennecott	N. Y.	23¼	22⅛	22⅛	Sept. '20 Q	.50
Keweenaw	Boston	...	...	1½	...	
Lake Copper	Boston	...	...	2½	...	
La Salle	Boston	2¼	2	2¼	...	
Magma Chief	N. Y. Curb.	...	...	*21	...	
Magma Copper	N. Y. Curb.	...	...	17	Jan. '19, Q	.50
Majestic	Boston Curb	*15	*13	*13	...	
Mason Valley	Boston	1⅜	1⅜	1⅜	...	
Mass Consol	Boston	3½	3½	3½	Nov. '17, Q	1.00
Mayflower-O.C.	Boston	5	4⅜	4⅜	...	
Miami	N. Y.	19⅜	19	19⅛	Aug '20, Q	.50
Michigan	Boston	3⅜	3⅛	3⅛	...	
Mohawk	Boston	58	56	57½	Nov. '20, Q	1.00
Mother Lode (new)	N. Y. Curb.	6	5⅜	5⅞	...	
Nevada Con.	N. Y.	11¼	11	11⅜	Sept. '20, Q	.25
New Arcadian	Boston	...	...	2⅛	...	
New Baltic	Boston Curb	...	...	3	...	
New Cornelia	Boston	18	17½	17⅞	Aug. '20,	.25
Nixon Nev.	N. Y. Curb.	...	...	*9	...	
North Butte	Boston	15⅜	14⅜	15	Oct. '18, Q	.25
North Lake	Boston	...	...	*25	...	
Ohio Copper	N. Y. Curb.	...	...	⅛	...	
Oilbway	Boston	2⅜	2	2⅜	...	
Old Dominion	Boston	23½	22⅛	22⅝	Dec. '18, Q	1.00
Osceola	Boston	31⅜	31	31	June '20, Q	.50
Phelps Dodge	Open Mar.	†175	†150	...	Oct. '20, Q	2.50
Quincy	Boston	43⅛	41⅞	43⅛	Sept '20, Q	1.00
Ray Con.	N. Y.	14⅛	13⅜	13⅛	June '20, Q	.25
Ray Hercules	Boston Curb	*60	*58	*50	...	
St. Mary's M. L.	Boston	37	35	37	June '20, K	2.00
Seneca Copper	Boston	22	19⅜	22	...	
Shannon	Boston	1⅛	1⅛	1⅛	Nov. '17, Q	.25
Shattuck Ariz.	N Y.	8	7⅛	7⅛	Jan. '20 Q	.25
South Lake	Boston	...	...	2	...	
South Utah	Boston	*10	*6	*6	...	
Superior Copper	Boston	4⅛	4⅛	4⅛	Apr. '17,	1.00
Superior & Boston	Boston	3	2⅜	2⅜	...	
Tenn. C. & C.	N. Y.	9⅛	9⅛	9⅛	May '18, I	1.00
Tuolumne	Boston	*55	*50	*50	May '13,	.10
United Verde Ex.	Boston Curb	*29½	*29	*29	Nov. '20, Q	.50
Utah Consol	Boston	5	4⅛	4⅛	Sept. '18,	.25
Utah Copper	N Y.	61⅜	58⅛	59	Sept '20, Q	1.50
Utah M. & T.	Boston	1⅜	1⅛	1⅛	Dec. '17,	.30
Victoria	Boston	1⅜	1⅜	1⅜	...	
Winona	Boston	*50	*40	*40	...	
Wolverine	Boston	11⅜	11	11	Jan. '20, Q	.50
LEAD						
Hecla Mining	N. Y. Curb.	4⅞	4⅛	4⅞	Sept '20, QX	.15
St. Joseph Lead	N. Y.	14⅛	14⅛	14⅜	Sept '20, QX	50
Stewart	Boston Curb	...	...	*13	Dec. '15,	.05
Utah Apex	Boston	3⅛	3	3⅛	Nov. '20, Q	.25
ZINC						
Am. Z. L. & S.	N. Y.	10⅛	9⅞	9⅞	May '17,	1.00
Am. Z. L. & S. pf.	N Y.	40	40	40	Nov. '20, Q	1.50
Butte C. & Z.	N. Y.	7	6⅜	6⅜	June 18, I	.50
Butte & Superior	N. Y.	16⅜	15⅜	16⅜	Sept. '17,	1.25
Con. Interst. Cal.	N. Y.	8¼	7½	7½	June '20, Q	.50
New Jersey Z.	N. Y. Curb.	...	...	169	Aug '20, Q	4.00
Success	N. Y. Curb.	3⅛	3	3	July '16,	.03
Yellow Pine	Los Angeles	...	...	*90	June '20, Q	03

*Cents per share. †Bid or asked. ‡Quotations missing. Q, Quarterly. SA, Semi-annually. BM, bimonthly. K, Irregular. I, Initial X, includes extra

Stock	Exch.	High	Low	Last	Last Div.	
GOLD						
Alaska Gold	N. Y.	1⅞	1⅜	1⅜	...	
Alaska Juneau	N. Y.	1⅛	1⅛	1⅛	...	
Carson Hill	N. Y. Curb.	...	...	22⅝	...	
Cresson Consol. G.	N. Y. Curb.	1⅛	1	1⅛	June '20, Q	.10
Dome Ex.	Toronto	*50	*42	*45	...	
Dome Mines	N. Y.	13	11½	12⅛	Oct. '20, Q	.25
Golden Cycle	Colo. Sprgs.	‡	...	*73	Sept. '20, Q	.02
Goldfield Con.	N. Y. Curb.	*9	*8	*9	Dec. '19,	.05
Hedley	Boston	...	...	4½	June '19,	.10
Hollinger Con.	Toronto	5.65	5.25	5.55	Nov. '20, X	.05
Homestake	N. Y.	...	...	45	Sept. '19,	.50
Kirkland Lake	Toronto	*44	*39½	*43½	...	
Lake Shore	Toronto	1.08	1.05	1.08	Oct. '20, K	.02
McIntyre-Porcupine	Toronto	1.95	1.92	1.94	Sept. '20, K	.05
Porcupine Crown	Toronto	*23	*23	*23	July '17,	.03
Portland	Colo. Sprgs.	‡	...	*60	Oct. '20, Q	.01½
Reorgan. Booth	N. Y. Curb.	*5⅛	*4	*4	May '19,	.05
Silver Pick	N. Y. Curb.	*6	*5	*6	...	
Teck Hughes	Toronto	...	...	*8½	...	
Tom Reed	Los Angeles	1.47½	1.43	1.43	Dec. '19,	.02
United Eastern	N. Y. Curb.	3 1/16	2 1/16	2½	Oct. '20, Q	.15
Vindicator Consol	Colo. Sprgs.	‡	...	*18	Jan. '20, Q	.01
West Dome Consol	Toronto	*5⅞	*5⅞	*5⅞	...	
White Caps Min.	N. Y. Curb.	*9	*7	*8	...	
Yukon Gold	Boston Curb	...	...	1¼	June '18,	.02½
SILVER						
Arizona Silver	Boston Curb	*21	*18	*20	Apr. '20, M	.03
Beaver Con.	Toronto	*39⅜	*37½	*39½	May '20, K	.03
Coniagas	Toronto	...	...	2.37	Nov. '20, Q	.12½
Crown Reserve	Toronto	*22	*22	*22	Jan. '17,	.05
Kerr Lake	Boston	3⅛	3⅛	3⅛	Oct. '20, K	.12½
La Rose	Toronto	...	...	*30	Apr. '18,	.02
McKinley-Dar.	Toronto	*49½	*47	*48	Oct. '20, Q	.03
Mining Corp.	Toronto	1.69	1.65	1.65	Sept. '20, Q	.12½
Nipissing	N. Y. Curb.	8⅞	8⅛	8⅛	Oct. '20, QX	.50
Ontario Silver	N. Y.	5⅜	5⅛	5⅜	Jan. '19, Q	.50
Ophir Silver	N. Y. Curb.	⅛	1/16	1/16	Jan. '12,	.10
Peterson Lake	Toronto	*12	*11⅜	*11⅝	Jan. '17,	.01½
Temiskaming	Toronto	*32½	*32	*32½	Jan. '20, K	.04
Trethewey	Toronto	*26¼	*24½	*26½	Jan. '19,	.05
GOLD AND SILVER						
Atlanta	N. Y Curb.	*2	*1	*1½	...	
Barnes-King	Butte	‡	...	1.11	Aug. '20, Q	.05
Bost. & Mont.	Boston	...	...	*63	...	
Cashboy	N. Y. Curb.	*6	*5	*6	...	
El Salvador	N. Y. Curb.	⅛	⅛	⅛	...	
Jim Butler	N. Y. Curb.	*19	*16	*17	Aug. '18, SA	.07
Jumbo Extension	N. Y. Curb.	*7	*5	*6	June '16,	.05
Louisiana Con.	N. Y. Curb.	...	...	1/16	...	
MacNamara M.	N. Y. Curb.	1/16	1/16	1/16	May '10,	.02½
N.Y. Hond. Rosar	Open Mar.	†11½	†10	...	Oct. '20, QX	.50
Tonopah-Belmont	N. Y. Curb.	1⅛	1⅛	1⅛	Oct. '20, Q	.05
Tonopah-Divide	N. Y. Curb.	1 1/16	⅞	1 1/16	...	
Tonopah Ex.	N. Y. Curb.	1⅛	1⅛	1 1/16	Oct. '20, Q	.05
Tonopah Mining	N. Y. Curb.	1⅛	1 1/16	1 1/16	Oct. '20, SA	.05
West End Con.	N. Y. Curb.	1 3/16	1 1/16	1 1/16	Dec. '19 SA	.05
SILVER-LEAD						
Caledonia	N. Y. Curb.	*19	*17	*17	July, '20, M	.01
Consol. M. & S.	Montreal	22½	22	22	Oct. '20, Q	.62½
Daly Mining	Salt Lake	...	...	2.40	July '20, Q	.10
Daly-West	Boston	...	...	4½	Oct '20, Q	.25
Eagle & Blue Bell	Boston Curb	2⅛	2⅛	2⅛	Apr. '20, Q	.10
Electric Point	Spokane	*14½	*14	*14½	May '20, SA	.03
Fed. M. & S.	N. Y.	10	9⅛	10	Jan. '09,	1.50
Fed. M. & S. pf.	N. Y.	...	...	31⅛	Sept. '20, Q	1.75
Florence Silver	Spokane	*25	*25	*25	Apr. '19,	.01½
Grand Central	Salt Lake	...	...	*37½	June '20, K	03
Iron Blossom	N. Y. Curb.	1/16	¼	¼	Apr. '20, Q	.02½
Judge M. & S.	Salt Lake	...	...	3.82½	Sept. '20, Q	.12½
Marsh Mines	N. Y. Curb.	*11	*10	*10	...	
Prince Consol.	N. Y. Curb.	1/16	¼	¼	Nov. '17,	.02½
Rambler-Cariboo	Spokane	*8	*6	*8	Feb. '19,	.01
Rex Con.	N. Y. Curb.	*6	*6	*6	...	
South Heola	Salt Lake	...	...	*85	Sept. '19, K	.15
Stand. S. L.	N. Y. Curb.	1/16	1/16	1/16	Oct. '17,	05
Tamarack-Custer	Spokane	2.10	2.10	2.10	Dec. '19, K	.03
Tintic Standard	Salt Lake	3.40	3.05	3.40	June '20, Q	.10
Wilbert Mining	N. Y Curb.	*4½	*3	*3	Nov. '17,	.01
NICKEL-COPPER						
Internat'l Nickel	N. Y.	17⅛	16⅞	17	Mar. '19,	.50
Internat'l Nick.pf	N. Y.	83¼	83¼	83⅛	Nov. '20, Q	1.50
QUICKSILVER						
New Idria	Boston	2⅛	2⅛	2⅛	Jan. '19,	.25
TUNGSTEN						
Mojave Tungsten	Boston Curb	...	...	*5	...	
VANADIUM						
Vanadium Corp.	N. Y.	64½	49½	52	Oct. '20, Q	1.50
ASBESTOS						
Asbestos Corp.	Montreal	94	89	89½	Oct. '20, Q	1.50
Asbestos Corp. pf.	Montreal	99	96½	98	Oct. '20, Q	1.75
MINING, SMELTING AND REFINING						
Am. S. & R.	N. Y.	61	57⅛	57⅛	Sept. '20, Q	1 00
Am. S. & R.pf.	N. Y.	91½	91	91	Sept. '20, Q	1.75
Am. Sm. pf.A	N. Y.	81	78⅛	80	Oct. '20, Q	1.50
U. S. Sm. R. & M.	N. Y.	55¼	52½	52½	Oct. '20, Q	1.50
U.S.S.R.& M. pf.	Boston	45	44	45	Oct. '20, Q	.87½

CURRENT PRICES OF MATERIALS AND SUPPLIES

IRON AND STEEL

SHEETS—Quotations are in cents per pound in various cities from warehouse also the base quotations from mill:

Blue Annealed	Large Mill Lots Pittsburgh	St. Louis	Chicago	San Francisco	New York Current	New York One Yr. Ago
No. 10	$3.55–7.50	7.09	7.13	8.65	$7.00– 8.00	4.82
No. 12	3.60–7.55	7.09	7.18	8.70	7.05– 8.05	4.87
No. 14	3.65–7.60	7.09	7.23	8.75	7.10– 8.10	4.92
No. 16	3.75–6.70	7.09	7.28	8.85	7.20– 8.20	5.02
Black:						
*Nos. 18 and 20	4.15–8.30	8.10	7.90	10.60	8.41– 9.80	5.80
*Nos. 22 and 24	4.20–8.35	8.10	7.95	10.65	8.46– 9.85	5.85
*No. 26	4.25–8.40	8.10	8.00	10.70	8.51– 9.90	5.90
*No. 28	4.35–8.50	8.10	8.10	10.80	8.61–10.00	6.00
Galvanized:						
No. 10	4.70–8.50	9.60	8.60	....	8.91–11.50	6.25
No. 12	4.80–8.60	9.60	8.70	11.35	9.01–11.50	6.30
No. 14	4.80–8.60	9.60	8.70	11.35	9.01–11.60	6.35
Nos. 18 and 20	5.10–8.90	9.60	9.00	11.65	9.26–11.90	6.65
Nos. 22 and 24	5.25–9.05	9.60	9.15	11.80	9.41–12.05	6.80
*No. 26	5.40–9.20	9.60	9.30	11.95	9.56–12.20	6.95
*No. 28	5.70–9.50	9.60	9.60	12.25	9.86–12.50	7.25

* For painted corrugated sheets, add 30c. per 1000 lb. for 5 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets, add 15c., all gages.

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago	St. Louis	San Francisco
Standard railroad spikes, ⅝ in. and larger	$4.00–4.25	$3.35	$3.40@$4.00	$5.47½	$7.75
Track bolts	6.00–6.50	4.35	4.60@ 5.00	....	8.75
Standard section angle bars	3.00–4.00	3.00	2.75@ 3.40	....	5.45

STRUCTURAL MATERIAL—The following are the base prices f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the $2.55 places named:

	Mill Pittsburgh	New York Current	New York 1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2.45@$3.10	$4.30	$3.47	$4.04	$3.97
Channels, 3 to 15 in.	2.45@ 3.10	4.30	3.47	4.04	3.97
Angles, 3 to 6 in., ¼ in. thick	2.45@ 3.10	4.30	3.47	4.04	3.97
Tees, 3 in. and larger	2.45@ 3.75	4.35	3.52	4.09	4.02
Plates	2.65@ 4.00	4.50	3.67	4.24	4.17

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
$4.00@$4.50	$4.00@$5.00	$2.55

RIVETS—The following quotations are per 100 lb.:

STRUCTURAL

	Mill Pittsburgh	New York Current	New York One Yr. Ago	Warehouse Chicago	Warehouse St. Louis	Warehouse San Francisco
⅞ in. and larger	$4.50	$6.11	$4.72	$5.00	$5.69	$7.05

CONE HEAD BOILER

⅞ in. and larger	4.60	7.10	4.82	5.10	5.79	7.15
⅝ and ¾	4.75	7.25	4.97	5.25	5.94	7.40
½ and 9/16	5.00	7.00	5.32	5.60	6.19	7.60

Lengths shorter than 1 in. take an extra of 50c. Lengths between 1 in. and 2 in. take an extra of 25c.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Hercules red strand, all constructions	20%
Patent flattened strand special and cast steel	20%
Patent flattened strand iron rope	5%
Plow steel round strand rope	30%
Special steel round strand rope	30%
Cast steel round strand rope	22½%
Iron strand and iron tiller	5%
Galvanized iron rigging and guy rope	+12%

Chicago, +10% on galvanized, 22½–2½% off on bright.
Western and California Territory:
20%, plow steel; 22½%, galv. iron rigging and guy rope.
Montana, Idaho and Arizona
15, plow steel, 27½, galv. iron rigging and guy rope.

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Denver	Chicago	St. Louis	Birmingham
Straight	$5.75	$8.15	$7.00	$7.00	$7.00
Assorted	5.85	8.40	7.15	7.15	7.25

BAR IRON AND STEEL—Per 100 lb. to large buyers at mill, Pittsburgh:
Iron bars..... $2.35@$4.00 Steel bars..... $4.27@$4.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Chicago	Denver
$0.10	$0.16½	$0.18	$0.11½	$0.15	$0.18

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham	Denver
Solid	12@14c.	13c.	20c.	14½
Hollow	17@20c.	...	...	21c.

WROUGHT PIPE—The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

BUTT WELD

Inches	Steel Black	Steel Galv.	Inches	Iron Black	Iron Galv.
⅜ to 3	54 to 57½	41½ to 44	⅛	5½ to 5½	+ 1½ to 11½
			¼	19½ to 9½	1½ to 11½
			⅜ to 1¼	24½ to 34½	8 to 18½

LAP WELD

2	47 to 50½	34½ to 38	2	20½ to 28½	6½ to 14½
2½ to 6	50 to 53½	37½ to 41	2½ to 6	22½ to 30½	9½ to 17½

BUTT WELD, EXTRA STRONG, PLAIN ENDS

2 to 3	53 to 56½	40½ to 44	⅜ to 1½	24½ to 34½	9½ to 19½

LAP WELD, EXTRA STRONG, PLAIN ENDS

2	45 to 48½	33½ to 37	2	21½ to 29½	8½ to 16½
2½ to 4	48 to 51½	3½ to 40	2½ to 4	23½ to 31½	11½ to 31½
4½ to 6	47 to 50½	35½ to 39	4½ to 6	22½ to 30½	10½ to 18½
7 to 8	43 to 46½	29½ to 33	7 to 8	14½ to 22½	2½ to 10½
9 to 12	38 to 41½	24½ to 28	9 to 12	9½ to 17½	5½ to+2½

STEEL—From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Cleveland	Black Chicago
⅜ to 3 in. butt welded	38%	39%	54@40%
3½ to 6 in. lap welded	33%	41%	50@40%

	Galvanized New York	Galvanized Cleveland	Galvanized Chicago
⅜ to 3 in. butt welded	22%	30%	40½@30%
3½ to 6 in. lap welded	18%	26%	37½@27½%

Malleable fittings, Class B and C, from New York stock sell at list plus 23%. Cast iron, standard sizes, net.

NUTS—From warehouse at the places named, on fair-sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	+$1.25	$1.50	List	$2.25	+$1.15	$1.0
Hot pressed hexagon	+ 1.25	1.50	List	2.25	+ 1.15	.85
Cold punched square	+ 1.25	1.50	List	2.25	+ 1.15	1.00
Cold punched hexagon	+ 1.25	1.50	List	2.25	+ 1.15	1.00

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	30%	50–10%
Chicago	40%	50%
Cleveland	50%	60–10%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	+10%	25%	20%
Larger and longer up to 1 in. by 30 in.	Net List	25%	10%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... List Cleveland..... $2.50 Chicago..... $1.90

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $7.00 Cleveland..... $4.50 Chicago..... $5.50

CONSTRUCTION MATERIALS

PREPARED ROOFING—Standard grade rubbered surface, complete with nails and cement, costs per square as follows at manufacturing points:

	New York 1-Ply c.l.	New York 2-Ply l.c.l.	New York 3-Ply c.l.	Philadelphia 1-Ply l.c.l.	Philadelphia 2-Ply c.l.	Philadelphia 3-Ply c.l.
No. 1 grade	$2.50	$3.00	$3.55	$2.40	$2.90	$3.45
No. 2 grade	2.25	2.70	3.20	2.15	2.00	3.10

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $4.25 per roll in carload lots and $4.50 for smaller quantities.

Shingles, red and green slate finish, cost $8.75 per square in carloads; $9.00 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York and Chicago:

Tar felt (14 lb. per square of 100 sq.ft.), per roll	$3.30
Tar pitch (in 400-lb. bbl.), per 100 lb.	2.25
Asphalt pitch (in barrels), per ton	56.50
Asphalt felt (light), per ton	132.00
Asphalt felt (heavy), per ton	138.00

HOLLOW TILE—

	4 x 12 x 12	8 x 12 x 12	12 x 12 x 12
Minneapolis	$0.1192	$0.2086	$0.3278
Seattle	.13	.175	.30
Los Angeles	.10	.175	.....
Cincinnati	.125	.2186	.8286

LUMBER—Price per M in carload lots:

	8 x 8-In. x 20-Ft. and Under				12 x 12-in. 20 Ft. and Under	
	P.	Fir	Hemlock	Spruce	P.	Fir
Boston	$73.00	$70.00	.....	$65.00	$85.00	$75.00
Kansas City	51.00	51.25	$51.25	51.25	60.00	51.25
Seattle	.....	32.00	.....	.....	.....	32.00
New Orleans	49.00	.....	.....	.....	55.00	.....
Baltimore	72.50	.....	.....	.....	82.50	.....
Cincinnati	45.00	50.00	50.00	.....	55.00	55.00
Montreal	87.00	87.00	70.00	85.00	79.00*	110.00
Los Angeles†	.....	57.00	.....	.....	.....	59.00
Detroit	57.00	.....	.....	.....	67.25	67.25
Denver	.....	43.75	.....	.....	.....	44.75

	1-In. Rough, 10-In. x 16-Ft. and under			2-In. T. and Gr. 10 In. x 16 Ft.	
	P.	Fir	Hemlock	P.	Fir
Boston	$110.00	$102.00	$52.00	$105.00	.....
Kansas City	102.00	106.50	106.50	113.00	$112.75
Seattle	.....	37.50	.....	.....	38.50
New Orleans	.....	42.00	.....	46.50	.....
Baltimore (box)	52.50@60	.....	.....	54@64	.....
Cincinnati	50.00	55.00	50.00	45.00	50.00
Montreal	80.00	80.00	70.00	85.00	85.00
Los Angeles	.....	58.00	.....	.....	.....
Detroit	43.00	.....	43.00	.....	44.00
Denver	.....	37.75	.....	.....	38.25

*Montreal—Up to 22 ft.; over which, $3.00 per M. increase up to 30 ft.

NAILS—the following quotations are per keg from warehouse:

	Mill Pittsburgh	Denver	Chicago	San Francisco
Wire	$4.25	$5.40	$4.45	$6.45
Cut	.....	5.90	8@11	8.95

PORTLAND CEMENT—These prices are for barrels in carload lots, *without bags.*

	Current	One Month Ago	One Year Ago
New York (delivered)	$4.10	$4.10	$2.30
Jersey City (delivered)	3.55	4.39	2.27
Chicago	2.35	2.35	2.00
Pittsburgh	2.42	2.42	2.05
Cleveland	2.73	2.73	2.32
Denver	3.25	3.25	3.12
Los Angeles	3.10	3.10	2.78
San Francisco	3.09	3.09	2.43

NOTE—Charge for bags is generally 25c. each, $1 per bbl.

LIME—Warehouse prices:

	Hydrated per Ton		Lump per 200-lb. Barrel	
	Finished	Common	Finished	Common
New York	$21.00	$20.00	$3.80*at plant	$3.60*
Kansas City	27.20	26.20	2.50	2.40
Chicago	.....	.....	.....	1.65
St. Louis	27.00	21.00	.....	2.50
San Francisco	25.40	22.00	.....	2.25
Minneapolis	29.50	23.00	2.00†	1.85†
Denver	32.00	.....	1.05 (bu.)	.....

NOTE—Refund of 10c per barrel, with 25c per ton off on hydrated.
* 300-lb. barrels. † 180-lb. barrels.

LINSEED OIL—These prices are per gallon:

	New York		Chicago	
	Current	Year Ago	Current	Year Ago
Raw per barrel (5 bbl. lots)	$1.07	$2.15	$1.20	$2.37
5-gal. cans	1.22	2.30	1.45	2.57
1-gal. cans	1.32			

WHITE AND RED LEADS—500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		One Year Ago		Current	1 Yr. Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. kegs	15.50	17.00	13.00	14.50	15.50	13.00
25- and 50-lb. kegs	15.75	17.25	13.25	14.75	15.75	13.25
12½-lb. kegs	16.00	17.50	13.50	15.00	16.00	13.50
5-lb. cans	18.50	20.00	15.00	16.50	18.50	15.00
1-lb. cans	20.50	22.00	16.00	17.50	20.50	16.00

MINING AND MILLING SUPPLIES

HOSE—

FIRE — 50-Ft. Lengths

Underwriters' 2½ in.	$0.85 per ft.
Common, 2½-in.	30%

AIR

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.60	$0.40	$0.30

STEAM—DISCOUNTS FROM LIST

First grade..... 20% Second grade.... 30% Third grade..... 45%

LEATHER BELTING—Present discounts from fair quantities (½ doz. rolls):

Light Grade	Medium Grade	Heavy Grade
30%	25%	20%

RAWHIDE LACING—For cut, best grade, 25%, 2nd grade, 30%. For laces in sides, 79c. per sq.ft.; 2nd, 75c. For semi-tanned: cut, 40%; sides, 83c. per sq. ft.

MANILA ROPE—For rope smaller than ¾-in. the price is ½ to $0.02 extra while for quantities amounting to less than 600 ft. there is an extra charge of $0.01. The number of feet per pound for the various sizes is as follows: ¾-in., 8 ft., ⅞-in., 6; 1-in., 4½; 1-in., 1¼-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ¾ in. and larger, in 1200-ft. coils:

New York	.29	Kansas City	$0.30½
Cincinnati	.35	Seattle	.28
Chicago	.27½	St. Louis	.26½
Minneapolis	.29½	Denver	.30
San Francisco	27	Los Angeles	.31

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$1.00
Asbestos for high-pressure steam	1.70
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.70
Compressed asbestos sheet	.90
Wire insertion asbestos sheet	1.50
Rubber sheet	.50
Rubber sheet, wire insertion	.70
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided and graphited, for valve stems and stuffing boxes	1.40
Asbestos wick, ½- and 1-lb. balls	1.10

RAILWAY TIES—For fair size orders, the following prices per tie hold:

Material	7 In. x 9 In. by 8 Ft. 6 In.	6 In. x 8 In. by 8 Ft.
Chicago—Plain	$2.00	$2.25
Chicago—Creosoted	2.25	2.50
San Francisco—Douglas fir, green	1.35	.96
San Francisco—Douglas fir, creosoted	2.50	1.92

Prices per tie at Missouri mills; St. Louis prices about 25c. higher:

Untreated A Grade White Oak 6x8x8		Untreated A Grade Red Oak 6x8x8	
No. 1	$0.80	No. 1	$0.60
No. 2	.90	No. 2	.70
No. 3	1.00	No. 3	.80
No. 4	1.25		

FLOTATION OILS—Prices of oils for flotation, in cents per gal. in bbls.:

	New York	Chicago In. Bbl.	Chicago Carloads
Pure steam-distilled pine oil, sp.gr. 0.93-0.94	$1.85	$1.90	$1.85
Pure destructively distilled pine oil	1.45	1.90	1.85
Pine tar oil, sp.gr. 1.025-1.035	.45	.34	.32
Crude turpentine, sp.gr. 0.900-0.970	1.75	1.30	1.17
Hardwood creosote, sp.gr. 0.96-0.99*	.35	....	....

*F.o.b. Cadillac, Mich.

COTTON WASTE—The following prices are in cents per pound:

	New York			
	Current	One Year Ago	Cleveland	Chicago
White	11.00-15.50	13.00	16.00	11.00-14.00
Colored mixed	7.00-10.50	9.00-12.00	12.00	9.50-12.00

WIPING CLOTHS—Jobbers' price per 1000 is as follows:

	13½x13½	13½x13½
Cleveland	$55.00	$65.00
Chicago	41.00	43.53

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25 lb. keg for black powder:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder
New York	.....	$0.3325	$0.3625	.....	$2.30
Kansas City	$0.2475	.27	.30	.34	2.40
Seattle	.18	.205	.225	.29½	2.60
Chicago	.2175	.2525	.2975	.34	2.45
Minneapolis	.2272	.2629	.2935	.....	2.90
St. Louis	.25	.285	.315	.3575	2.60
Denver	.2250	.26	.29	.3325	2.80
Los Angeles	.22	.27	.31	.....	2.95
Atlanta	.2575	.2975	.3225	.3650	2.55
Cincinnati	.2275	.2525	.2725	.....	2.30
Montreal	.30	.32	.37	.38	4.10

CHEMICALS

SODIUM CYANIDE—New York price is 28@32c. per lb.; Chicago, 30c.; St. Louis, 34c.; Birmingham, 45c.; Denver, 40c

SODIUM SULPHIDE—New York price per pound is 7c.@ 7½c. for concentrated, Chicago, 5c. for concentrated, 3½c. for crystals. Denver price is 6c. for crystals. St. Louis, concentrated 10½c., crystals 11c. Concentrated comes in 500-lb. drums; crystals in 440-lb. bbl.

ZINC DUST—For 350 mesh the New York price is 12@13c. per lb.; Chicago 12½c.

ALUMINUM DUST—Chicago price is $1.10 per lb.; Birmingham, $1.52.

MINERS' LAMP CARBIDE—Prices net f.o.b. cars at warehouse points:

	Union 100-Lb. Drums Per Ton	Cameo 100-Lb. Drums Per Ton	Union Single 25-Lb. Drums	Union 25-Lb. Ton Lots
East of the Mississippi, North of Chattanooga	$106.00	$101.00	$1.52	$1.49
Southeastern portion U. S. A.	115.50	110.50	1.63	1.60
Texas (except E. Paso)	124.00	119.00	1.74	1.71
El Paso, Texas	126.00	121.00	1.77	1.73
Denver, Col.	124.00	119.00	1.74	1.71
West Coast	129.00	124.00	1.81	1.77